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IN TWO SECTIONS • SECTION ONE

OCTOBER

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A STANDARD PRICING BASE TO PROMOTE CORRECTIVE ACTION IN PRODUCT PRICING POLICIES

by ALLEN H. OTTMAN,
Vice President and Controller,
American Hard Rubber Co., New York, N. Y.

In the course of this paper a procedure is outlined which results in a unit figure for each product, designated as a standard pricing base and built up beyond factory standard cost to include commercial expense and product markup. The utilization of this figure to test and possibly, in the last analysis, to adjust inadequately considered or defective pricing of products is described in terms of competitive situations which may exist.

THE immediate considerations of keeping the plants busy, earning a profit this year, and carrying current operating expenses is the first concern of most companies, including our own, in establishing selling prices. However, selling prices set with only this objective in mind may lead to failure over a longer period. In order to realize the greatest potential profit which can accrue to any corporation, the effect of selling price determination must be considered over a long period of time, i.e., ten, fifteen, twenty, or twenty-five years, depending on the company and the industry in question. Since the determination of sales price following these principles must take into consideration many factors, some of which defy measurement or control, it is a job which requires the most far-sighted and practical judgment possible. In this endeavor, accountants can provide mileposts for the sales executives and general management to use as guides when traveling the relatively uncharted areas on the road to successful pricing.

Competition — What Kind?

Competition is the common term used for stating the factors affecting price determination. But let us define the term further, since competition takes many forms. There is the immediate competition of a competitor's product. Although the product may have the same utility, it may be made of different material, in a different labor price market, by a different process, and sold under differing conditions. Each of these factors has an important and significant bearing upon the respective abilities of individual manu-

facturers to compete in the market place. Then there is the competition of products of different utility but which if developed, modified, or otherwise changed, might eliminate or reduce the need for the company's product.

Another aspect of competition—and hence of price determination—often overlooked, is the ability of the management of a company to compete with other managements in the industry. The company which is the best organized and has the corresponding trained manpower, brains, and ability possesses a real competitive advantage which in time should be reflected in efficiency and economy of operation. Along the same lines, there are physical factors such as the relative location of the company's buildings, machinery, and equipment; the relative effectiveness of space utilization; etc. These are part and parcel of a company's capacity to compete and find its final expression in the ability to charge a lower price for a product or service of equal or greater quality than can be met by competition.

In many cases all the competitive factors mentioned above cannot be given individual careful consideration at the time prices for specific products are established. However, studies of the competitive advantages and disadvantages of a particular company are a great help to management in assisting them to make the pricing decisions which in the long run will provide the company the greatest potential profit. These studies need not be general or "up in the air" but may be concrete and factual and provide a basis against which to test the soundness of the company's existing price structure.

Company Products and Processes

The American Hard Rubber Company represents a case with particularly difficult problems in pricing. So that these problems may be viewed in better perspective and to develop a better understanding of how we attempt to follow the principles and consider the factors mentioned above, a brief description is presented of the company's operations.

The American Hard Rubber Company is essentially a custom molder of hard rubber and plastics. We make what others would like to have us make. A relatively small percentage of our finished end product is made for the ultimate consumer and marketed under the company's brand names. We do have some products which fall in the category of consumer type items, such as "Ace"

combs and bowling balls, but the majority of our products are those of a derivative demand which stems from consumer demand for products assembled and merchandised by other manufacturers.

We have manufactured approximately 60,000 different standard products in the course of several years, with an additional number of job lot products numbering approximately 2,000 per year. Not all of the standard products are active in any one year. In the last few years the active number of standard products has been reduced to about 7,000 per year. Approximately 500 standard products are produced for stock, with the balance produced on specific customers' orders. Our products are divided into 38 major product lines, and these are subdivided in turn into 100 minor product lines. Consumer items are distributed through wholesalers, but all other products are sold directly to other manufacturers or contracting companies. In the course of a year we service approximately 4,000 customers. All but ten per cent of the business is done in the United States, with customers in each of the 48 states.

Manufacturing operations are carried out in two plants. One, located in Akron, Ohio, is essentially a mass production molding shop. The other, in Butler, New Jersey, is a combination production molding and job shop. There are four major stages of operations at the plants: material preparation, forming, finishing, and packing and shipping. The cost center layout was designed to segregate costs by departments following supervisory responsibility lines and natural separations below the supervisor level by process lines, product lines, or operations. This segregation is further split into machine groups, working units, product lines, or special expense classes to obtain the breakdown of costs necessary to insure fair and equitable allocation of costs to the individual articles and to provide valuable statistical data for control of operations. In each plant, there are approximately 25 departments and 100 operating cost centers.

All products have several operations in each of the major stages. Some have as many as forty or fifty separate operations before being shipped to customers. In many cases, dissimilar products for a variety of end-users, in quantities ranging from one special purpose piece to millions of identical pieces, pass through the same cost center, through the same machinery, and through the same operation.

Standard Factory Cost by Products

Direct Material (including compound mixing labor). The plant chemist department is responsible for establishing the compound formula and mixing specifications, as well as standard time for material preparation through the compound mixing operation. The chemists also specify the compound which is to be used in making any product. Standard prices for each ingredient entering the compound are established by the procurement department at the beginning of the year. These prices are set based upon prices in effect at the beginning of the year and include the cost of incoming transportation.

From this standard data and using current evaluated job labor rates for the operations involved in preparing the compound, plant accounting prepares the standard direct material cost for each product. Product standard direct material costs are revised throughout the year only when the variation between standard and actual would make a significant difference in the total standard factory cost for the product.

Direct Labor and Other Direct Materials. The product engineering department is responsible for establishing the manufacturing specifications (including *other* than formula direct material) and standard times for all operations after compound mixing. From this standard data, using current evaluated job labor rates for the operations involved in forming, finishing, packing, and shipping the product, plant accounting prepares the standard direct labor and other direct material costs.

Overhead. In order to provide a more realistic treatment of overhead costs, overhead has been split into two parts. Prime overhead represents overhead costs which normally vary in proportion to the volume of production, such as indirect hourly labor for maintenance work on equipment and indirect supplies. Secondary overhead represents overhead costs which normally do not vary in direct proportion to the volume of production, such as depreciation, taxes, insurance, and normal costs of staff departments in the manufacturing division.

On certain operations, both prime and secondary overhead has been further split to show costs applicable to the product based upon machine time required. For example, on a hydraulic press operation, part of the overhead cost varies with the amount of direct labor and part varies with the cycle time on the press. Ma-

chine time rates have been established to properly reflect the cycle time costs.

Extra Material. Extra material generally consists of inserts which are molded into the product or hardware which is assembled or shipped with the product and on which, according to company policy, we will not apply the standard product line markups normally used in calculating sales price. In some cases, extra material is purchased by the customer and sent to us "no charge." In other cases, we purchase the extra material and include the purchase price plus incoming transportation in costs. In either case, the overhead cost of handling this material is included in the computation of the standard product cost.

This separation of extra material from direct material is necessary as extra material is often a very large percentage of the total cost of the finished product. In order to maintain the same standard selling and administrative expense and standard markup, whether or not the customer elects to furnish the extra material in cases in which such election is permitted by company policy, the calculations related to determination of standard allowance for these cost elements are based on standard factory costs excluding extra material. Thus the only difference in the standard pricing base (including these allowances as brought out later), which depend on a customer's action, would be the cost of the extra material itself.

Damage Allowance. Standard damage allowance is based upon manufactured product cost, i.e., standard factory cost before damage, and is determined by dividing this cost value by one minus the damage allowance per cent, expressed in decimals. The standard damage allowance represents a reasonable allowance which should be attainable with the facilities in use. Most extra material is 100 per cent recoverable in case of damage to the product. However, in those instances where this is not true, a reasonable damage allowance is also included in costs to recover for this type of material.

Total Standard Factory Cost. The addition of all of the costs which have been discussed so far gives us the total standard factory cost. Provided the plants operate at the standard capacities upon which our overhead distributions are based, without change in labor rates or indirect material costs, and at normal efficiency, no excess costs of operations should result.

STANDARD COST
ESTIMATED COST — FOR XYZ Company — A

ESTIMATE NO. —
SAMPLE NO. 27129

DESCRIPTION
#32 Handle
Steel 4-3/4" x 1-1/8" x 3/4"
Drawing #ZB-960-A
Made in 40 Cavity Mold

Compiled By G.S.H.
Checked By I.C.
Date Effective 9/12/49
Last Std. Cost $7.95
Date of Last Cost 5/11/49

Product Inv. Class 002
Sales Class 362210
Piece Ident. Code —
Estimate No. —
Economical Lot Size 9000
PLANT ACCT. G.A.B.

WEIGHTS PER 100 pcs. GROSS 13.60# NET 12.40#

COST CENTER	OPERATIONS	DIRECT LABOR & MATERIAL MINUTES	DIRECT LABOR & MATERIAL RATE	DIRECT LABOR & MATERIAL AMOUNT	PRIME OVERHEAD MINUTES	PRIME OVERHEAD RATE	PRIME OVERHEAD AMOUNT	SECONDARY OVERHEAD RATE	SECONDARY OVERHEAD AMOUNT	EXTRA * MATERIAL	ACCUMULATED TOTALS
	Cpd. No. 989 @ 13/60#	-	.1589	2.16							
	Mixing No. 989 @ 13/60#	-	.0050	.07	-	.0065	.09	.0085	.12		
212	Mach. 13.60#	3.54	2.245	.08	-	200%	.16	189%	.15		
213	Cut Stock	1.00	2.103	.02	-	148%	.03	199%	.04		
218	Pull apart and reject stock	15.00	1.800	.29	-	71%	.21	28%	.08		
221	Press - load and unload	15.00	2.517	.40	-	242%	.97	163%	.65		
221	Use of press	-	-	-	153.85	.275	.42	.222	.34		
611	First inspection (Schedule)	-	-	.11	-	-	.06	-	.09		
788	Pull apart and scrape	19.50	1.769	.34	-	59%	.19	52%	.18		
611	Second inspection (Schedule)	-	-	.04	-	-	.02	-	.03		
852	Packing labor and overhead (Sch.)	-	-	.08	-	-	.04	-	.10		
852	Packing mat'l and overhead(Sch.)	-	-	.04	-	-	-	-	-		
	TOTALS			3.83			2.19		1.78	-	7.60

QUOTATION NO.	QUANTITY	PRICE	UNIT	SHIPMENT
AA-4972	50,000	10.75	C	

Manufactured Product — Standard Factory Cost Before Damage	69.4	7.60
Damage Allowance (% Std. Factory Cost — Mfd. Product)	5.4	.57
Manufactured Product — Standard Factory Cost	74.8	8.17
Extra Material Cost (Incl. - % S - Standard Damage)	-	-
TOTAL STANDARD FACTORY COST	74.8	8.17
Standard S & A Expense (9.4 % Mark-Up on Std. Fact. Cost Mfd. Product)	7.2	.79
Standard Mark-up (18 % Mark-Up on Std. Fact. Cost—Mfd. Prod. & Std. S&A)	18.0	1.81
STANDARD PRICING BASE	100.0	10.77

Price Set By H. B. B. Date 5/13/49

Standard Selling and Administrative Expense by Products

Organization planning is a staff activity responsible for preparing the standard salaried organization requirements in order to meet the normal objectives of the business. The organization requirements are expressed in terms of jobs of specific range as determined from studies of the organization by departments and as ranked under our job evaluation procedure. Each salaried job required carries a rate range. For the purpose of establishing the standard salaried payroll by departments, we take the midpoints of the salary ranges.

For other selling and administrative expenses, such as traveling, communications, advertising, contributions, memberships, and a variety of other items, we set standards based on past experience or future plans. In effect, we come out with a standard selling and administrative expense by departments based upon the normal volume of business.

Administrative service departments such as administrative planning, accounting, etc., are studied for the purpose of properly distributing these costs to sales product groupings. Sales department expenses are similarly broken down by product grouping. Based on these studies, a standard selling and administrative expense per cent on manufactured product (standard factory cost exclusive of extra material cost) is established by product grouping at a level calculated to recover our selling and administrative expenses under normal conditions.

Standard Markup by Products

Market research and statistics staff, in collaboration with the sales staff, studies the products with the objective of establishing standard markup (profit percentages) to apply on manufactured product (standard factory cost exclusive of extra material but inclusive of standard selling and administrative expense). These standard markup percentages are established by product grouping and are calculated to yield the company an adequate profit return from operations at normal capacity and with normal product (sales) mix.

Standard Pricing Base

The standard pricing base is the total of standard factory cost plus standard selling and administrative expense and standard markup. The standard pricing base so determined represents the

price at which articles should be sold in order to yield the planned profit for the company under normal operations. Its development is shown, step by step, on Exhibit 1, a perusal of which will retrace for the reader the material which has been covered so far. This base is a *guide* for pricing purposes and is also used to measure the variation between standard profit as planned and the actual profit realized. An analysis of this variation provides management with information as to where and how to take such corrective action as may be required to maintain an adequate profit for the business. It is with the use of this guide and the undertaking of such corrective action that the remainder of this article is concerned.

Establishing Selling Prices — In General

With the standard pricing base established, the standard product cost sheets are turned over to the sales staff. It is their responsibility to establish the final selling price. As will be seen, this function is not conducted in summary fashion or without much consultation within various departments of the company—and here the standard pricing base is made to play a real part. It is necessary to consider the objectives, principles, and factors affecting successful pricing in order to realize the greatest potential profit. Therefore, considerable research, analysis, and exercise of practical judgment is the practice in carrying out this responsibility. Of course, in some cases, price setting will move along pretty quickly. For instance, where competitive information is not obtainable or where there is no indication of what price the customer would be willing to pay, the standard pricing base might, itself, be quoted as the final selling price. In other cases, sales staff will establish the selling price simply on known competition from other manufacturers of the same product at a level calculated to give us a fair share of the business. Nevertheless, the existence of a standard pricing base offers a means of testing the effect of prices, however set, and our over-all procedure gets around to this in a way which may be of general interest.

Disclosure of Subnormal Profit Margin Situations

In the fall of each year we develop a unit sales budget by minor product groups for a year in advance, including also enough major items to give us 90 per cent of the volume in terms of dollars for each product line. By thus limiting the products studied, we reduce the number of items for sales budget and sales price re-

view to approximately 600 products or minor product groups. The individual salesmen estimate the sales by customers, by territories, and in units of individual products wherever possible. These estimates are reviewed with the product line sales managers and consolidated by product lines. Market research and statistics staff attempts to trend the normal line of growth or decline of these products and correlates such normal trend to anticipated business conditions. These unit forecasts are then reviewed by the vice president in charge of sales.

The budget department builds on the correlated forecasts and gives the sales department an historical record of units shipped by each product included in the 90 per cent quota during the last three years and estimated shipments for the current year as developed from the forecasts mentioned above. They also give sales an estimate of the open orders as of the end of the year, based upon orders available at the time the budget estimate is prepared plus such orders as may be expected or are in prospect before the end of the year, less expected shipments against such orders. The sales department is also given for each product the unit selling prices in effect at the time the budget is prepared, the total standard factory cost, standard selling and administrative expense, standard markup, and standard pricing base. Normal weekly production for each product is likewise shown and the basis for determining that production—for example: number of molds available, cavities per mold, number of shifts operated, minutes per cycle, number of presses required, size of presses, and number of molds that can be operated per press.

The estimated unit shipments for each product are priced at the average net selling price realized (current sales price, less discounts) to arrive at a dollar volume of sales for the forecast. Since the forecast is based upon those items which give us only 90 per cent of the volume, we increase the dollar volume of sales calculated on the forecast to bring the total for the product line up to 100 per cent. Similarly, the estimated shipments are costed in terms of standard factory cost, standard selling and administrative expense, standard markup, and standard pricing base to determine the totals by product lines for these items to compare with the total dollar volume of sales forecast. *All "loss" and subnormal yield items are asterisked for the attention of the sales department.*

The sales department then knows what items are yielding less margin than that which studies have shown to be the normal margin over factory cost. They take such items and study them to the "nth" degree because this is how a company may adjust and correct past errors in pricing and how the greatest possible contribution may be made, from sales viewpoint, toward increased margin yield. For example, if there is a competitive opportunity to adjust the selling price of a particular item to yield the planned margin, sales may properly be held accountable for failing to make the required adjustment unless it can be clearly demonstrated that such pricing would be uneconomical and detrimental to the long-range competitive position of the company.

Tentative sales arguments against upward repricing a particular product might be, "If such a price is established for a product, although it can be obtained now, competition will be encouraged to enter the market to a point where the yield on the lower volume will be less than on present volume and prices." Providing standard profit markups have been correctly set, this argument would be valid only at a time when operations were running under normal capacity and the lost volume could not be replaced by a more profitable line of product. Or sales might also say, "We are trying to develop sales of this product for a large potential market and our present price is designed to give us entry into the market and resultant future volume which would yield the desired profit margin." Such reasoning can be substantiated or refuted by factual studies of the product development engineer and market research and statistics staff who are charged with the responsibility of investigating products in this situation.

Correction of Subnormal Profit Margin Situations

Those items which, for no valid selling reason, show a subnormal factory profit margin are listed for further study by factory product engineers whose field includes product design and specifications, compound, process, operations, equipment used, and in fact every phase of the business of producing the product. These items, because of their importance in respect of sales volume and the questions raised as to pricing, are the ones which the product engineers should concentrate upon for the coming year. On the assumption that competition is able to make a profit on products which yield us a subnormal profit margin, and therefore must be able to manufacture and distribute such products at a

lower cost, we study thoroughly the possibility of manufacturing and distribution economies.

In industrial companies generally, manufacturing costs and economies in the plants have for a long time been the chief concern of management. While this is still a fertile field for improvement, the why, what, when, where, and how questions in this field have been pretty well covered. As for distribution costs, however, the subject is relatively unexplored. Such costs may run from four per cent to five per cent in certain types of companies to as high as 60 per cent of the sales dollar in other types of companies.

Market research and statistics staff compares these costs, as far as they can determine them, *for any industry and for every company in such industry that is in competition with us.* They pick those companies which are doing the best job and make an especial study of their method of distribution. Attempt is made to find out how these companies pay and reward their salesmen, how many they have, how they are selected and trained, how and where they are routed, whether they operate against measured sales quotas, and other objective criteria. Market research staff, advertising staff, and the sales force collaborate to find out what advertising and sales promotional helps the competitors are giving as compared with what we do along these lines. The salesman can be a big help in such a study because he is in the "front line trenches," competing with other salesmen for the business of the same customer. If he sees a selling aid, something better than he has been provided to work with, or ideas and opportunities for the introduction of new or improved products, he should be the first to report these facts to the company.

Based upon this information and intensive study of our own distribution operations, we endeavor to determine those economies that can be made to put us in a more favorable competitive position. If, after making these studies, we find that there is no way to reduce manufacturing or distribution costs to a point where the company can earn a normal profit on a particular item, the questions come squarely up to management, "Why are we handling this product for sale?" "Do we have to handle it?"

How can these questions be answered? If you have to sell a full line of products, there are probably some competitors who can make a certain product for less than you can, and in order to get the business in other lines, sales officials will say, "We have to carry this product even though it yields a subnormal profit or even

shows a loss." The protection for the president and controller against faulty reasoning along these lines lies in market research. If the statement is true, management is much better off to know it. If not, the profitability of the whole line should be explored.

If there is no valid selling reason for carrying low margin or loss items, only one other reason should be advanced for manufacturing such products. When a plant is operating at less than normal capacity, it may be temporarily advisable to sell such items in order to obtain volume necessary to help carry secondary costs which do not vary proportionately with the volume of business. But here a word of warning is in order. Do not ride this horse to death. Too many have tried it, too often to their sorrow. Particular care should be exercised in making decisions of this kind because of the effect they might have on other lines of product.

The Over-All Effect of Product Pricing Policies

There is an over-all test for pricing as well as a product test. In this direction and based upon the studies which have been described and decisions reached, the unit sales budget by product lines is revised and carried through to a profit and loss statement. If the over-all profit shown is subnormal at a time when the industry is consistently equalling or exceeding the company's standard rate of profit return, it is plain that the company is not keeping up with the procession, that it is uneconomical in manufacturing or in distribution, or both; or poor judgment is being used in making price determinations.

Road to Successful Pricing

Successful pricing is a difficult task requiring factual knowledge of all of the business operations, as related to individual products, by competent personnel blessed with sufficient imagination and practical judgment to enable them to make intelligent decisions. To obtain the greatest potential profit for the company, facts are necessary and, in most cases, it is the job of the accountant to see that these facts are not only obtained but effectively used.

Competition among companies is the lifeblood of the business economy. Intelligent competition, based on a factual knowledge of costs of operation and distribution, must inevitably bring a healthier, more productive economy, as well as proper rewards to those companies which through application of modern management techniques, survive to enjoy them.

THE PHILOSOPHY OF CONVERSION COST PRICING

by FRED L. HEATH,
President, Fred L. Heath & Co.,
Chicago, Ill.

Contending that the utilization of conversion labor and plant facilities is the appropriate basis on which to construct desired profit markup on products for identification of more and less profitable items and for related management action, the author of this article points out that such a viewpoint places manufacturing companies in the light of service organizations. It is suggested that the pricing basis advocated makes the development of standard prices and the employment of selective selling especially desirable.

ACCEPTANCE of the philosophy that profits should have a relationship to services rendered—which is the basic concept of conversion cost pricing—will change a company's perspective and objectives, will initiate a change in the direction of sales effort, and will increase company profits substantially if selective selling is initiated on products with the highest profit per dollar of conversion cost. The basic difference between conversion cost pricing and the percentage on cost or profit as a per cent of sales principle of pricing is that the yardstick is changed. Instead of measuring the profit value of a product or customer against the amount of money involved in the sales value or in cost inclusive of materials, the profit is measured against the amount of services performed.

All companies are interested in selling the most profitable products or jobs to the greatest degree practical. In order to determine the relative profitability of products, the accepted practice has been to measure profit in terms of selling price, i.e., as a per cent of sales. However, if executives would measure profit of their products against the amount of work they perform in their plant to produce these products, they would find that by selling selectively on this basis, the company could make the same or more profit with less work in the plant. Such a check would also show that the amount of labor and overhead used to produce a dollar of profit varies so widely as to suggest that current pricing is in a state of chaos with respect to utilization of conversion dollars for profit realization.

To illustrate, assume that a company has two products each selling for $2.50. The total cost for each is $2. So far, they appear equally profitable, each producing 20 per cent on sales. But suppose that the cost breakdown is as follows:

Item of Cost	*Product* "A"	"B"
Labor and overhead	$1.00	$ .40
Materials	.40	1.00
Sales and administrative	.60	.60
Profit	.50	.50
Price	$2.50	$2.50

On Product "A," $1. of labor and overhead produces 50 cents profit. However, on Product "B" the company uses only 40 cents in labor and overhead to make the same 50-cent profit. If a greater number of the Product "B" units were sold, greater profits with less work would result. The implication is obvious. Yet there is a fixity of viewpoint in many business minds which makes it hard to dislodge the thought that the items are equally profitable. If an applicant for work stated that it made no difference to him whether he worked 40 hours a week at $1. an hour or 80 hours a week at 50 cents an hour, inasmuch as he would in either case be earning $40. a week, he would be thought mentally deficient. Yet the illustration which has been given reveals a company performing 150 per cent more work on one product than another without making any more profit.

What Does a Manufacturer Sell?

This brings up a question more pertinent than is commonly realized, "What *is* the company selling?" Ninety-nine out of 100 sales managers or salesmen would probably answer in terms of the company's principal product. There might be one in a hundred who would answer, "My company is selling the use of our facilities. We are taking materials people will not buy and changing their shape, size, form, and appearance into a useful product in which customers are or can be interested."

Acceptance of this philosophy makes a company a service organization. Each buyer of products or jobs has, in effect, rented the use of labor and supervision, equipment, and buildings for a short or longer period of time to convert materials into something he can use and, if the company is in effect a service organiza-

tion, is it not logical to assume that profit should have a relationship to the services rendered in converting materials?

Jones vs Smith as Customers

A few hypothetical figures will clarify the picture. Jones Company gives a $10,000 order. The seller's total cost is $8,000. Jones is considered a valued customer because there is 20 per cent net profit on the $10,000 sale and perhaps the company average net profit is thirteen per cent. Smith Company also gives a $10,000 order but the company's total cost on the goods is $9,000. The business is accepted, not welcomed, as only ten per cent is made on the sale to the Smith Company, less than the company average. However, these orders are better looked at in another way. If a quick examination shows that the services rendered on products or jobs sold to Jones (the labor and overhead, i.e., the conversion cost) amount to $4,000, this means that Jones receives $4,000 of service and his order yields $2,000 profit, 50 cents on each dollar of service rendered. Smith's business, on the other hand, nets only $1,000 but examination shows the material value was high and the conversion cost was only $1,000. The profit yield on conversion cost is $1,000 for $1,000 of service, dollar for dollar.

Assume further that the company has an existing conversion cost capacity for $100,000 of production and that facilities for producing Jones' or Smith's business are interchangeable. If the sales organization commits the capacity of the plant to Jones', the $100,000 conversion capacity would be used in 25 transactions like the order cited above ($4,000 conversion cost per transaction) and on each transaction profit would be $2,000. In all, it would be $50,000. However, if the $100,000 conversion capacity were sold to the Smith type of customer, 100 orders of the size previously indicated could be handled ($1,000 conversion cost per transaction) and on each transaction $1,000 profit would result or a total company profit of $100,000.

The Case of a Foundry

A specific case example will illustrate the end result of an analysis, the purpose of which was to determine how a company could increase profits even under competitive conditions. The company was a job shop producing castings. Each customer's business had to be considered as a whole. It was impossible to say to customers, "We will accept orders from you for castings on

which we can make money but take the others elsewhere." Two hundred customers accounted for 85 per cent of the volume.

Each customer's volume was analyzed to determine an answer to the question, "How much profit was made on the customer's total business?" and "How much of the conversion (labor and overhead) capacity did each of these customers require or use?" The ratio of total profit by customer to the total conversion cost used by the customer was then established. The profit per dollar of conversion cost, computed by customer, ran from a loss upwards to 260 per cent profit. The company average was 40 per cent profit per dollar of conversion cost.

The customers producing the greatest profit per dollar of conversion cost were then grouped together. The final summary showed that 50 per cent of the company's total conversion cost of $1,000,000 produced 93 per cent of its total operating net profit of $400,000. Thus, $500,000 of the conversion cost produced $372,000 profit and the other $500,000 accounted for loss jobs and produced $28,000 profit.

Plans were then made to study the markets. What types of customers in the profitable bracket were buying what types of castings? What comparable companies were there? Where were they located? A campaign was put on to get these companies' business, dropping customers in the unprofitable bracket as quick as volume was secured from new customers in the higher profit bracket. A sales remuneration plan was developed to pay salesmen for results, i.e., profitability of their sales, rather than for effort (sales volume). A very substantial increase in profits without increase of fixed invested capital resulted.

Utilization of Standard Prices

Companies establish or hope to establish an accurate cost system. If they have streamlined their business, they have a standard cost system. The present practice is to then try for a predetermined profit as a per cent above factory costs or as a per cent of the sales dollar but often, due to competition, the result is "pricing to a market." Conversion cost pricing calls for completion of costs. Factory costs are partial costs. To factory costs must be added the cost for administration and sales and the amount of minimum profit a company desires. Profit should be an element of cost rather than residue.

Using the principle of conversion cost pricing, a company will

develop a standard price and the establishment of this economic right price will be apart from possibility of present realization. On some products or jobs, if a company is forced to sell for less than the standard price due to competition, the management will know what the profit deficiency is amounting to. If the company can sell for more than the standard price, it will do so and can make up the profit deficiency on sales made at less than standard price. Substandard profit items will be sold under control, limiting such sales to customers whose business is of the profitable type. A variance account can be established to place responsibility on the sales department by showing the degree company profits are affected favorably or unfavorably by concessions made on prices or for sales at higher than standard price.

If the standard price on a job or product is higher than competitive prices, the first step should be to determine whether or not there is a good potential market for such jobs or products. If the potential market is sizable, a number of questions are in order. Can costs be reduced to justify selling at a lower price and still make the average preplanned profit? Can the product be redesigned to use less materials? Can less expensive materials be substituted without affecting quality or appearance or styling? Can costs be reduced by purchasing some parts cheaper than the company can make them? What better manufacturing methods could be developed to reduce costs by increasing the production with the present personnel? What special purpose equipment might be developed to reduce costs? Is the company's wage incentive plan streamlined to give the maximum production?

If costs cannot be reduced sufficiently to produce average profit, analysis should be made to determine if it is necessary to keep the product in the line. If not, it can be discontinued. If it is necessary, such substandard profit items must be sold under control and to customers who give orders for more profitable types of products.

Plans should be devised to remunerate salesmen so that it will be less interesting to them to sell low profit items and more interesting to them to sell the more profitable products or customers. Often highly competitive items which have a low profit are not sold. The salesmen take orders for them. If a salesman is volume conscious, it is the fault of the management rather than the salesman. Due to higher break-even points, too many executives today are primarily volume conscious and secondarily profit conscious. A salesman cannot control the amount of profit on indi-

vidual products as he does not control the cost or establish the price, but the salesman can control the direction of his effort.

About High Profit Jobs

Products or jobs which show a profit higher than the company average need not necessarily be reduced in price. Such products will offset the deficiency on less profitable products which it may be necessary to produce and sell. However, study should be given to determine if lowering a price on overpriced items will increase the volume sufficiently to raise profits substantially. To return to the foundry example, the company discovered that it was making 260 per cent on conversion cost on one type of casting when the company average was 40 per cent. If plastics or a gray iron casting are sold in the same market for less than the price which produced 260 per cent conversion cost profit, the company may successfully compete with plastics or gray iron castings by taking only 70 per cent or 80 per cent profit on conversion cost. The foregoing of the additional profit may permit it to sell competitively with other types of castings.

Inertia To Be Overcome

To be elementary, a company operating net profit is the difference between total costs and the net sales income. Most companies are continually battling to reduce costs, keep outgo to a minimum. Very few companies give equal attention to calibrating, evaluating, and preplanning the type of income received, in order to assure income of the more desirable class. Most managements are primarily volume conscious and, secondarily, profit conscious. They assume that profit follows volume. This philosophy is as faulty as the philosophy that quality necessarily has relationship to a company size or that right is proportionate to might.

Generally it will be found that it is not easy to interest company executives in conversion cost pricing and its use for increasing profit. They are willing to get the most modern cost system, production system, and equipment but, inasmuch as the philosophy of pricing has remained the same for many years, i.e., a percentage on factory cost or a predetermined profit as a per cent of the sales dollar, they will be inclined to let habit, custom, and tradition chloroform imagination. However, Bruce Barton once said, "When we're through changing, we're through." It takes imagination plus courage to change one's thinking and action.

PRICING PRODUCTS TO YIELD PLANNED RETURN ON PLANT AND WORKING CAPITAL INVESTMENTS

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Why do stockholders invest? In the present paper, the concept of planned return on investment is carried through, in a suggested procedure, to product pricing policies. The technique described develops separate ratios for including return on plant investment and return on working capital in proposed selling prices. Stress is laid on the professional responsibilities of the accountant to offer guidance in pricing decisions.

THE problem of determining the selling price of a product is one that has confronted individuals and enterprises alike with varying degrees of difficulty from the very beginning of the economic interdependence of man. With the industrial revolution and the attendant rise of the modern industrial corporation, the question of "how much" for a product became ever more complex. The interests of ownership or capital pulled away from those of craftsmanship or labor and yet both were dependent for their well-being upon the one who has come to be "always right," the customer. While there seems to be evidence of a new awareness on the part of both labor and capital that they must work together and that their interests are not diverse, the policies of the past have most assuredly left their scar upon our economic life. This has been nowhere more evident than in the policies adopted by all too many industrial managements in pricing for sale the products produced by labor from raw materials and with facilities furnished by capital. The welter of confusion and frustration gave birth to the famous motto which has probably been uttered by nine out of ten sales managers, "Competition sets the selling price."

A Question of Responsibility

Let us assume for the moment that the proper spirit has now been kindled, that we all—management, capital, and labor alike—have a desire to accomplish sound results in this matter of determining who gets what and why. Have industrial accountants, as

the representatives of management, accepted the responsibility of furnishing an intelligent portrayal of the facts of business or have they been content to sit back and inferentially (or even directly) delegate the solution of essentially accounting problems to those by no means qualified to see the problem in its entirety?

Up to now, the latter situation has prevailed in the main. We have often been utterly profound in our determinations of "cost." We have distributed and redistributed burden so many times and in so many ways that sometimes we have even confused ourselves. We have become quite learned and professional but it has also been the end of the line for most of us. At that point we have departed from the train and allowed management, which had been looking to us for aid and direction, to proceed alone and on foot through the economic wilderness to that outpost called "selling price."

And what has management generally done under those circumstances? It has asked competition, and sometimes a deadly and infectious form of competition, to point the way to "outpost selling price." Grateful to its new-found guide, management has all too often been lured into the easy habit of relying upon it in all things, only to be betrayed more often than not into financial disaster.

In the matter of pricing, let us stay with our managements until the job is done so that their guidance will not be limited to the prices charged by others. Let us be anxious to recognize competition as a member of our society but let us also use our efforts to cleanse his soul and enable him to associate with us as a healthy and productive individual. Unless we do that we cannot claim to be professional men. A doctor does not abandon his patient on the operating table. A lawyer would not allow his client to be the victim of false testimony. As accountants, we must not desert our managements in the determination of pricing policy.

Costs for Pricing — Yesterday and Today

The purpose of this paper is, first, to stress the importance of product pricing for profit control and the strategic position of the chief accounting officer in such policy determinations and, second, to point out a way of attacking the problem. Assuming that we accept the theory of product pricing by means of enlightened management decision rather than by management abnegation of its fundamental responsibilities by resort to competitive pricing only, let us proceed to a consideration of how we might put that theory

into practice after a brief look at what our attempts to assist in this area have amounted to so far. A thumbnail sketch of how in the past, and sometimes even today, we have often done this job of product pricing might be illustrated by the following example:

COSTS FOR PRICING DECISIONS—YESTERDAY

Material	$100.
Direct labor	40.
Manufacturing overhead	60.
	$200.
Commercial overhead	20.
	$220.
Profit	22.
Proposed selling price	$242.

Now, somewhere in the development of cost analysis, some cost accountants were sharp enough to note that this sort of a product cost breakdown left much to be desired. Questions concerning the effect of volume on cost, the proper basis for absorbing material handling overhead and other special types of overhead, the treatment of specific selling expense, commissions, royalties, and research and development expense, plagued cost accountants. As a result, it is not too uncommon today to see product cost sheets resembling another one which appears below:

COSTS FOR PRICING DECISIONS—TODAY

Material	$100.
Direct labor	40.
Manufacturing overhead:	
Variable	30.
Fixed	20.
Material handling overhead:	
Variable	8.
Fixed	6.
Research and development	5.
Special tooling	4.
Royalty	3.
Specific selling	8.
General selling and administrative	6.
	$230.
Profit	23.
Proposed selling price	$253.

What About Tomorrow?

That brings us to the end of the line and we are ready to explore the wilderness—that margin over total cost which represents profit and appears in both statements as a percentage on cost.

In order to intelligently approach the problem of what profit should be added to the cost of a product in order to get a selling price, we must stand away from the figures for a moment and put on the cap of an economist or even of an investment banker. This is rather hard for an accountant to do, for he is accustomed to dealing with figures that balance or add up to amounts which can be proved by comparison with control figures. However, if we are to live up to claims of being professional men, we must go further. We must develop our imagination to the point where we can appreciate and understand the effect of all forces which influence our economic activity and, lastly, we must be able to portray a common-sense analysis of these forces which can be used as the basis for management decision and action.

In the field of selling price determination—after the job of cost determination has been completed—this means a study and understanding of the basic purpose of corporate investment. The profit motive is the backbone of our economic society in general, just as it is in particular the stimulant to corporate investment by the stockholder. It is an economic crime when a corporation does not pay an annual dividend to its stockholders, for it violates the fundamental premise upon which all investment is made. This simple fact, then, must be our starting point in the final determination of "how much" for a product after total cost has been compiled.

Specifically it means looking at the balance sheet of the company and reducing its sometimes complicated and highly technical combinations of figures to a few fundamental concepts. To assist us in coming to grips with the problem, let us reason from a condensed balance sheet of a typical corporation:

BALANCE SHEET

Assets		*Liabilities*	
Current Assets...	$ 700,000.	Current Liabilities	$ 200,000.
Properties	500,000.	Net Worth.....	1,000,000.
	$1,200,000.		$1,200,000.

Planning Net Profit to Give Stockholders Desired Return

Suppose we assume that the stockholders have decided that, in order to make their investments worth while, a profit of 30 per cent per year (before provision for income taxes) must be earned. In this example, the amount would be $300,000. The planned *general* selling and administrative expenses are contemplated to equal $200,000 for the period under consideration. This is the figure we would get if we extended the figures on each cost sheet comparable to the $6 which is on the sample cost sheet (we can make illustrative use of the data shown earlier as "Costs for Pricing Decisions—Today") for each item in the sales budget. Thus the planned total gross margin must include a provision for this $200,000 as well as $300,000 in net profit. In addition, of course, each individual planned selling price must include a specific provision for direct selling expense—cash discounts, salesmen's commission, royalties, etc.—just as we have them in the sample but, since these are generally added in direct relationship to the selling price, we need not be concerned with them for present purposes. Right now we desire to plan a gross margin which is needed to cover general selling and administrative expense and profit in each of the product items, so that the amounts provided for bear a definite relationship to the investment of the capital of the business required in the production of each.

In other words, each of the $23 provisions for profit (or whatever amounts are provided therefor), rather than being, in fact, calculated as a percentage of cost, are computed for each item in the sales budget to produce the $300,000 which is necessary to keep the stockholders happy. However, since the stockholders' $1,000,000 is invested in two more or less different types of assets we have to be careful that each dollar, wherever it may be invested, earns its keep. We must be careful not to overwork the dollars invested in working capital or net current assets and allow the dollars invested in buildings or machinery to earn less than their fair share of that 30 per cent, or $300,000. The reverse situation may also be the important one where dollars invested in brick and mortar are overworked as against those invested in working capital. Now, how do we find out how much each of the two types of assets should earn? Since our $1,000,000 net worth in this example is divided equally between plant assets and net current assets, one half of the $500,000 required (that is, the sum of the $300,000

net profit and the $200,000 to cover general selling and administrative expenses) should be produced on the capital invested in fixed properties and the other half should be produced on the working capital investment.

Return on Investment in Plant

Return on plant may be taken up first. As a whole, the $500,000 planned gross margin represents 50 per cent on the investment in net worth of $1,000,000. To cover this ratio on the plant investment of $500,000, $250,000 is needed. We must build up a rate for it in terms which can be applied to each product. If product costs in the company are developed using a single overhead rate in relation to direct labor, we need merely provide for the relationship of the desired $250,000 margin to the planned direct labor in planning the portion of gross profit to be recovered on plant investment. This is to say that the amount of gross margin that should be recovered on the investment in the physical assets would be computed in relation to the relative time required in the production of each product. Or, if varying burden rates are used, the desired margin may be related to planned conversion cost. As an example, if the planned conversion cost (cost of direct labor and overhead required in the production of all the products) is $2,000,000 for the year, the relationship of the $250,000 margin to be recovered on the plant investment would call for the application of 12.5 per cent to the conversion cost in each product in planning its price, as illustrated below:

PROVISION FOR RETURN ON INVESTMENT IN PROPERTIES

Properties			$ 500,000.
Planned conversion cost			2,000,000.
Properties / Net worth	$ 500,000. / $1,000,000.	=	50%
50% of $500,000. (over-all required return)		=	250,000.
$ 250,000. (required return on fixed capital) / $2,000,000. (planned conversion cost)		=	12.5%

Return on Working Capital

An additional amount of margin to be recovered on the investment in working capital would be applied to the total manufactured cost of each product. This base is chosen because it is comparable to working capital. If the working capital turnover (net current

assets divided into the sales) is five times during the year, a total working capital of $2,500,000 would in effect be turning over during the year (on the basis of the figures in the sample balance sheet) and ten per cent of this amount would produce the amount of $250,000 which is required to be earned by net worth invested in working capital. Thus, to pick up $250,000 on the $500,000 working capital investment (if the five turns is a reasonably accurate estimate), we need only apply ten per cent to the total cost of material, labor, manufacturing and material handling overhead to make provision for this portion of the gross margin. An illustrative computation is presented as follows:

PROVISION FOR RETURN ON INVESTMENT IN WORKING CAPITAL

Net working capital		$ 500,000.
Turnover 5 × $500,000		2,500,000.
Net working capital / Net worth	$ 500,000. / $1,000,000. =	50%
50% of $500,000. (required return)	=	$ 250,000.
$ 250,000. (required return on working capital) / $2,500,000. (working capital turned over)	=	10%

Tomorrow's Pricing Guide

Thus, in this simple example, we would apply 12.5 per cent to the per unit conversion cost and ten per cent to the total per unit manufactured cost to compute the gross margin that should be recovered in each of the products to cover general selling and administrative expense and profit. In so determining, we have reached our "tomorrow's" product cost and pricing summary:

PRODUCT COST AND PROFIT MARGIN FOR PRICING DECISIONS

Material	$100.
Direct labor	40.
Manufacturing overhead:	
Variable	30.
Fixed	20.
Material handling overhead:	
Variable	8.
Fixed	6.
	$204.

Profit plus general selling and administrative:		
12.5% of $104	$13.	
10% of $204	20.	
		$ 33.
Research and development		5.
Special tooling		4.
Royalty		3.
		$249.
Specific selling		8.
Proposed selling price		$257.

Limited Applicability of Conversion Cost Pricing

The application of a rate to cover profit and general selling and administrative expense on the total of direct labor and manufacturing expense, has been termed the conversion cost principle of product pricing. Where any attempt at all is made to apply reasoned amounts of profit to cost in order to determine selling price, this principle has generally been advocated but, unfortunately, it has been advocated as the sole consideration which should have any influence in determining selling price. The proposition of deriving profit based on the amount of net worth tied up in working capital has been almost completely overlooked. Is this not a case of stopping short of the goal? While it is refreshing to note that some accountants have concerned themselves about the manner in which we tack on profit in order to determine a selling price, it is equally disturbing to hear it bruited about that conversion cost pricing provides the answer to all our pricing problems.

With that proposition many of us are unequivocally in disagreement. A substantial number of the dollars invested by the stockholders of any business are required, not only to convert raw materials into finished products, but also to maintain inventories and carry receivables. It is not conversion alone which entitles us to earn a profit. We are entitled to a profit, comparable to the profit earned on conversion, on the necessary warehousing of materials in inventory and the carrying of accounts receivable. It takes money to carry these assets, stockholders' money, and the stockholders have a right to demand a return on these dollars.

You might say that is theoretically correct but why not get those necessary dollars by increasing the conversion cost profit percentage so that the total amount earned will cover all the needs of the stockholders. After all, you say, the only basis we have for

asking for a profit is that we have added something to the product. We have converted raw materials and parts to a state of greater usefulness to society. It is my opinion that if this line of reasoning were carried to its logical but unfortunate conclusion, it would place us in the position of asking for no profit on parts purchased from vendors which sometimes are used in further production as a component of a finished product but other times are resold as such without any conversion to higher form. The conversion cost principle, taken alone, would recognize no difference in profit content between two products which require the same conversion cost but which have a greatly varying cost of material content.

And so I return to the fundamental proposition which was presented earlier in this paper: Let us plan a gross profit margin which is needed to cover general selling and administrative expense and profit in each of the items we sell so that the amounts provided for bear a definite relationship to the investment of the capital of the business required in the production of each.

Holding the Fort

Thus far there has been no discussion of the very practical proposition, "What happens when you cannot sell for the computed price and it must be shaved or even materially reduced in order to be competitive?" Once again the mettle of the accountant is tested when this happens. If he has won the right to be included in the ranks of professional people, he will not allow his management to take the first step toward having its throat cut. He will be prepared with analyses to show the effect upon net earning and net worth of promiscuous undercutting of the desired profit margin. Most important of all, he will be prepared to give cogent advice in a technique which has sometimes been called selective selling. This amounts to nothing more or less than recommending changes in the sales pattern or mix, so that products which enjoy a favorable competitive position may be sold at or higher than the desired price in sufficient quantity to offset the limited but sometimes necessary distribution of products which must be sold for less than the desired price.

The accountant must, in addition, be an excellent budgeter, one who can visualize alternative methods of management operation. He must be able to paint a figure picture of the effect of these several alternative proposals. Last but not least, he must be able to recommend that management decision which is best for the eco-

nomic health of the entire corporation and its stockholders, and not necessarily the one which will produce the greatest sales volume. The abnormal postwar demand for merchandise has made it possible for most manufacturers to devote facilities and material to production of what they believe to be their most profitable products. This practice has, in most cases, caused profits to soar. Market contraction will soon see the return of the old policy, intentional or otherwise, of haphazardly permitting the high profits of one product to offset the low profits or losses of another. Such a policy was never safe.

During this recent period, when many manufacturers have abandoned unprofitable lines, jobbers and retailers have learned that these lines are obtainable from new sources at still lower prices. It would be dangerous to assume that buyers will some day revert to their original source of supply. The desirability of "rounding out a line," even if unprofitable, in order to confine a buyer to one source, will be questioned. It is interesting but tragic to observe how slowly industry as a whole learns that volume alone does not spell profits. Usually it is too late to seek an answer for reduced profits or losses which occur despite increased volume. Management learns too late that the volume enthusiasts in the sales department have unbalanced profit plans through the sale of an abnormally large volume of low profit or no profit items.

Although management strives to maintain the proper proportions of investment in land, labor, and plant in order to obtain the largest net profits on total investment, somehow this principle is too often disregarded in the distribution plan. Volume is the order of the day, with insufficient attention given to product pricing and selective selling. It is time that pricing policies were related to the fundamental purpose for which the stockholders' money is risked—return on investment.

THREE PILLARS OF PRICE: COST, THEORETICAL MARKET, AND MARKET POSITION

by NORMAN H. GROSS,
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The author of this presentation sees little merit and much danger in selecting a single element on which to base prices even though, as with cost in recent years, economic events have given it especial prominence and a temporary degree of reliability. He feels that dependence on the competitive price level or company position in its industry's market is by no means safe, and points out that a sound pricing policy involves alertness to these and similar factors —and their interrelationship—at all times.

THE development of a sound pricing policy requires analysis of many factors. Theoretically the sales price is the market price but, conversely, the sales prices set by individual manufacturers of a given commodity create what we term the market price. The position of a manufacturer in price setting must always be that of determining the price level of each commodity that will give maximum stability and income to the enterprise over the period of the foreseeable future.

A Composite of Influences

Cost alone cannot be the determining factor in the setting of sales price. From a theoretical viewpoint, cost should not even be a major factor. Its place is rather to determine whether or not a given plant can produce an item profitably at existing prices and so meet competition. The mere fact that one manufacturer may, because of outmoded facilities, inefficient supervisory personnel, poorly trained labor, bad plant layout, or weak management, have a much higher cost of production does not make the finished article any more valuable in the eyes of the consumer. Nevertheless, it is likewise true that another manufacturer whose costs are unusually low due to relatively high efficiency and good management coupled with good plant and facilities will produce, at a lower cost than his competitor, finished products having the same market value to the ultimate consumer and which the consumer will buy.

Here theory requires modification. It may be strongly suggested that, although price may have little relationship to the cost of all producers, it does often have a practical "bottom" relationship to the cost of the most efficient producers.

If the markets for all finished products were clearly allocated among the producers and if all any producer had to do to maintain his relative position in any industry was to hold prices at a fixed level and all were content to do so, competition as we know it would no longer exist. In our current economy, actions of each producing firm tend to influence both the price and volume of its production and the price and the volume of all other suppliers in the field. Management must require a complete appraisal of the effect of price changes on volume and the calculation of the volume changes resulting therefrom on over-all production costs.

Management's approach to the pricing problem has in past years and must in the future be to arrive at that sales price which will conserve the investment of the stockholders and maintain the market position of the plant, whether or not a reasonable return can be earned in each and every period. For purposes of this article, the pricing problem is considered in the following sequence of elements: (1) pricing based on cost, (2) pricing based on theoretical market, (3) pricing based on market position, and (4) a sound pricing program.

The Cost Basis and the War Years

In the field of pricing, prior to the advent of the war-born shortage economy and government controls, cost was seldom considered as a basis for setting prices. The determination of cost was used only to measure the relative efficiency with which an individual concern operated and to determine the profitableness or lack thereof of a given product. With the advent of World War II, manufacturing concerns entered into a period without parallel in our industrial economic history. We not only had cost-plus-a-fixed-fee contracts in which the sales price was directly based on cost but, because of price control (absent in World War I) and unprecedented demand, we also had a situation in which almost all selling prices bore direct relationship to cost and where very little attention, from a pricing standpoint, was given to market.

Most concerns were entering entirely new fields in which markets might have existed but, where they existed, sufficient production capacity could not be found to meet the needs of the war so

that oil well casing firms were making aircraft jigs and dies and watch factories were making instruments. Automobile plants were making wings and machine shops of the one-man variety were turned into manufacturing plants with hundreds of employees. The exigencies of the situation demanded that the contracts be let and that the materials be produced as speedily as possible despite questions of cost or efficiency. Various types of pricing formulae were employed, virtually all of which used cost as the basis. In addition to the fixed fee contracts previously referred to, there were contracts let on a time and material basis and still others let on what was termed an "open contract" basis where the price was to be determined after production of a stipulated number of units had been completed, this price being determined by actual production cost plus an allowance for a reasonable margin of profit. In addition to the methods in which the price was directly based upon cost, renegotiation provisions which affected all war contracts were such that all prices eventually came to be determined by cost.

"Cost Plus" Recovery in Price Not an Economic Right

The net result of this wartime experience has been to impregnate the minds of a large segment of the management group with the thoroughly false economic theory that a producer is entitled to recover cost plus a profit for having produced, regardless of the relative efficiency with which production was achieved. The extent to which this theory has spread has been so great that almost the only argument existing in the minds of many has been the argument as to the share to be taken by the company, by the government, and by labor. Labor has apparently been convinced that a portion of profits (but not losses) rightfully belong to it.

During the depression, it was not at all unusual for top management to consider and sometimes to effect price cuts below cost of production in order to keep facilities operating and to prevent deterioration in plant and equipment and loss in industry position. Even in normal times, management has often made price reductions below current production costs in order to secure greater volume and resulting production efficiency so that ultimate cost would permit a reasonable profit and a greater percentage of the product market.

As we return to a normal economy with all the problems resulting from deflation, we find ourselves more and more in a position of having both raw materials and finished goods inventory valued

in excess of reproduction cost or at least at somewhat greater costs than that for which we could reasonably expect to reproduce the item within a short period of time. In addition, many factories find themselves with outmoded equipment and the resulting cost of production should be, and will have to be, greatly reduced with installation of new and improved plant facilities if the factory is to continue to operate. All of these factors make it absolutely imperative that pricing be removed from the sole basis of cost if we are to perform a useful function in a normal economy. The necessity for a realistic viewpoint as to pricing policies cannot be overemphasized in our current economic readjustment. Management's job is to control costs to the point where they can sell products profitably in a competitive economy, and this responsibility cannot be met by blindly expecting prices to follow costs.

The Theoretical Market—In Practice

The existence of a free economy presumes the presence of a theoretical market for all products, the market being set by supply and demand. If the market were an unlimited one, no particular problem would exist in the field of pricing except that of discovering what the market actually was. This in itself would constitute a difficult task, in view of the fact that markets are in a continuous state of change.

To round out the picture of market price, however, we must take into consideration the fact that markets, per se, are created and do not exist independently of their creators. We might define selling costs as the costs involved in creating or expanding the market. In connection with setting prices based on a theoretical market, we must analyze the amounts to be spent for each given product and for trade name advertising as well as general sales expense, all of which enter into the increasing or maintenance of a consumer market. Advertising expenditures, which increase costs of selling of a given product, will affect the market for that product and can result in comparative increase in demand and price.

A management which desires simply to maintain its current position within the industry and to maintain volume consistent with economic trends has only to determine the selling expenses required in order to maintain its position at the prices set by competitors. We could term this practice as pricing at theoretical market. Any company adopting this policy faces a very dangerous

road in the years ahead. Such a company is a questionable asset to the economy. If the sole aim of the firm is to maintain status quo, the probabilities are that its useful life expectancy is relatively short.

While pricing at theoretical market price is no more the answer to pricing problems than is pricing at cost, both factors certainly must be considered in arriving at a sensible program for product pricing. Certainly the market has a more legitimate function in pricing policies than does cost. The very existence of changing markets is one of the few remaining evidences of a free economy and it is the responsibility of all managements to maintain their competitive market in order to insure a continuing democratic economy.

Market Position—Price Cutting

A third basis of product pricing is that of market position. In connection with this paper, market position is used to indicate a company's position in its industry (percentage of market) and the relationship of this position to pricing policies. In programming pricing, it is considered sound procedure to be influenced by the company's plans for growth, stability, or decline. In other words, in the event management feels that it can profitably handle and obtain a larger percentage of the product market, it is accepted practice to take such action as can be reasonably expected to better the individual company's position in this market.

This policy often finds expression in both expanded advertising campaigns and in price cutting. The danger of haphazard use of pricing based on market position is that it can lead to vicious price cutting without production of any tangible results. Where it is blindly adopted as a result of falling sales this is especially true. As we get further into the so-called "buyers' market," more and more of the relatively weak managements will blindly pursue the price cutting policies (legitimately used in pricing for market position) without any reasonable basis or any honest analysis of probable consequences. Although sales increase through price reduction and although the stimulation of consumer demand is an integral part of any sound planning program, the theory that volume means profit should not be followed incautiously. Pricing based on market position must always be used only as a part of a long-range program and the pricing policy must be an integral part of a sound product pricing and development program in which all

phases of the business and all economic trends have been considered.

Market Position—Loss Pricing

While it is not necessarily sound to suppose that all products must always be sold at a profit, it is likewise unsound to proceed on the theory that loss pricing will capture the market and eventually produce a millenium for the firm. In some cases, an individual product, if a relatively minor part of the product line, may be consistently sold at a loss price in order to protect the balance of the product line and to prevent other suppliers from getting "their foot in the door" of the customers of any given concern. Any protective pricing policy adopted to maintain or better market position must bear sound relationship to all of the company programming and certainly must be coordinated with both projected cost and projected market.

Programming for betterment of market position has many prerequisites, including the ability to produce the desired volume as cheaply or more cheaply than any other firm in the industry, the ability to achieve proper distribution, the ability to meet all financial requirements, etc. The goals we set should always be analyzed to make sure that attainment is going to produce what is really wanted. It can be seen, therefore, that, while pricing for market position is not, in itself, a sound pricing program, it is a factor in the development of a sound program which requires thorough analyses of all factors of the business and of all economic factors which affect the business.

Sound Pricing Is Balanced Pricing

As can be seen from what has gone before in this article, the answer to the development of a pricing program is not cost, theoretical market, or market position alone, although all do play an important part in the formulation of pricing programs. A pricing program must be developed based on market and market position after giving full consideration to adjusted forecasted costs. Management must base its entire pricing program upon a sound analysis of both external and internal factors which affect the operations of the business.

The external factors involved are those of general economic conditions which affect market for any product, together with indus-

try conditions which create a competitive element within each industry. In addition to these factors, the pricing program must be interrelated with the company's general sales planning, since the sales and pricing programs are essential elements involved in the primary object of productivity—getting manufactured products out of the plant into the hands of the consumer.

In connection with the development of sales and pricing policies, it is necessary that management have complete and reliable forecast information so that it will have available unit product costs at all reasonably anticipated levels of productivity. The availability of this information, together with adjusting information (discussed in the following paragraph) makes it possible for management to determine its sales and pricing policies with full knowledge of their probable consequences, both on the income statement and the balance sheet. As previously stated, costs do not necessarily justify selling prices, but any firm which continues to set selling price with no reasonable knowledge of cost is shooting in the dark and will probably reap the consequences.

Cost Adjustment Information

The accountant has the responsibility, in addition to preparation of forecasts mentioned above, of providing information that will allow adjustment of the projected costs due to extraordinary circumstances. For example, a firm may have outmoded plant and equipment which create a relatively higher per unit cost of production for certain products or line of products than corresponding costs of their competitors. In such cases, the forecast cost at the various levels of productivity will have to be adjusted for that portion of the cost due to the outmoded equipment or other items of a like nature.

Items causing excessively high costs should be carefully studied with the thought of planning to remove the causes over a period of time, so that the company's competitive position can be improved. Raw materials should always show in the cost projections at market or projected market and the cost of the stock on hand, be it higher or lower than market, should never distort the projected cost to be used for setting of product prices. Since pricing policy will normally be a fairly long-range program projecting into the future, historical gains or losses due to inventory or other problems should never be allowed to enter into calculations.

When management has a properly prepared projected cost analysis, together with an analysis of prospective sales programming with sales forecast worked out on various pricing and sales policies, the executives are in a position to weigh the probable consequences of the various alternatives open to them in order that sound judgment may be applied to the individual company pricing problem.

It may well be that a slight loss over a relatively short period of time may be the alternative which offers the company the greatest future return. In times of business depression, management is quite often faced with the alternative of temporarily closing the plant or producing at a loss and trying to use the loss pricing and the effect thereof to achieve more business over the foreseeable future of the company. Plant closing always produces losses, both from an income standpoint and from the standpoint of the effect such interruptions have on personnel and equipment. It is often better to use times of adversity to build up industry position rather than to run and hide in closed plants.

The Final Answers May Be Simple

No sound approach exists to the problem of pricing policy except that of making a complete analysis of all factors based on projections over the foreseeable future. The future of any company may well depend upon the soundness of its pricing policies. These policies must at all times be related directly to the advertising and sales program and they certainly must represent the best thinking within every department of the business. Simple answers are never immediately available in fields where judgment rules but, where sound judgment based on facts is applied, most questions do turn out to have relatively simple answers even if arduously arrived at.

Cost Plus Percentage of Cost — Yesterday and Today

Colonel T. R. Rampy's "Auditing Air Force Procurement" which appeared in the *N. A. C. A. Bulletin* last spring (April 1, 1949, issue) was most interesting to read. It is excellent as a clear exposition of the armed services' procurement contract terminology and policies. However, he makes one statement which, while technically correct, is misleading. He writes, "It is not uncommon to hear the statement that the more a contractor spends in producing an article . . . the greater the fee or profit. Such remarks are based on the 'cost-plus-a-percentage-of-cost' form of contract which was in use in World War I and often used in private business, but which has been illegal for use by Government agencies for many years." He, and others who make like statements, imply that the principles and formula of a cost-plus-a-percentage-of-cost contract have been adandoned, that current procedures are entirely different, and that such current methods, in themselves, supply much greater protection to the taxpayer than the outlawed methods.

This is hardly the case. However, the circumstances of past years quickly become dim. Hence, a little background may help. World War I ended over thirty years ago, cost accounting techniques have advanced, and a new generation of accountants has been developed. Hence, the outlawed contract and some then current conditions, such as the lack of good accounting, should be reviewed for the benefit of the new generation, before contending (as later in this letter) that the effects of current practices are oftentimes very similar to the old.

When World War I began in Europe, the income tax was only one year old, cost accounting techniques were meager, and many currently accepted cost principles were almost as mysterious then as the atom bomb is now. Figuring depreciation, for example, was a new-fangled idea and the organization that experimented with standard overhead rates was indeed a pioneer and was considered either rash or progressive.

Under the cost-plus-a-percentage-of-cost contract, production and administration costs were accumulated on the job order cost accounting plan and were audited by the armed services' representatives (resident auditors and continuous auditing were commonplace) to determine their propriety. Moreover, to obtain such contracts, many producers had presented reliable estimates of cost as well as evidence of stability, effectiveness, and/or ability to perform. True, the more costs a contractor could incur or "slip in," the more profit, and there were abuses that led to congressional action, but admissible costs were defined and the auditors' pencils were poised, although the definitions naturally were not as complete or sound and the auditors not as numerous as recently. There was also a severe excess profits tax comparable in many ways to the recent levies.

In spite of the denunciation of the cost-plus-a-percentage-of-cost type of contract, many whose observations span both wars think that its continuation under more adequate control would have produced, in many instances, results less costly to the Government, and thus to the taxpayer, than those under the World War II contract types which are being perpetuated. These latter types are as follows (quotations from Colonel Rampy's article):

Cost plus fixed fee contracts—"The Government agency and the contractor agree on . . . a reasonably accurate estimate of the cost of production (without fee or profit) and then determine a fixed fee" as a percentage of the estimate, usually six per cent.

Price redetermination contracts—The original contract price "is subject to revision at a stated time or after a specified amount of production, based primarily on the actual cost. . . ."

Straight fixed-price contracts—These "can be the result of competitive bids or negotiation." The former was a commonplace type of transaction during World War I also. These fixed-price contracts are subject to audit, like the others, with the principal objective "to obtain cost and production statistics for use in estimating on new procurement or in negotiating for additional units."

The cost-plus-a-percentage-of-cost contract formula is definitely recognized in each of the above contract types—a percentage of cost is very often used to set the profit increment in the original price and enters into any modification of it determined from actual costs, by renegotiation, or in a negotiated new price for a new order or a renewed contract. Of course, any profit figure originally determined as a percentage of cost may have been modified somewhat, such as by rounding the figures, to give the appearance of an arbitrary origin.

Under each type of contract, it behooves the contractor to estimate on the high side in order to protect the profit to which he is entitled if the cost should be as high or higher, and then to insure that actual cost at least approaches the estimate in order to avoid suspicion of the original estimate and in order to protect his profit rate and percentage on succeeding orders or on contracts for a succeeding period (where contracts are renewed periodically). This is particularly pertinent in periods of rising costs as during World War II. Moreover, if a contractor can make his estimated and actual costs coincide, even the arithmetical results can be identical with those which would have been arrived at under a cost-plus-a-percentage-of-cost contract.

There are few circumstances under these newer contract types which encourage a contractor to hold down costs, and the newer types subject every contractor to the same, if not greater, pressures to let costs "take their course" than under the cost-plus-a-percentage-of-cost terms. In addition, the contractor is encouraged to ignore the newest and the best control tool he has—standard and predetermined costs for determining variances—and to use, instead, accumulation of actual costs under a job-order system.

This letter should not be interpreted as a criticism of the earnest efforts of Colonel Rampy and other Government representatives in proceeding under the regulations promulgated for them. The letter's intent is to urge an end to the "kidding" about the situation, to cut through the veneer or screen thrown over the old terminology, and to indicate that the cost-plus-a-percentage-of-cost contract formula continues and that it is a keynote of present contracts. This formula actually may produce lowest costs and best results for the Government and the taxpayers.

Contributed by N. MADISON CARTMELL, *New York Chapter*

PRODUCTION PLANNING AND INVENTORY CONTROL FOR MARKET MAINTENANCE AND PENETRATION

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In the construction and execution of a production plan, successive questions as to currently marketable quantities, the potentials of the market, profitability of products, customer service needs, inventory risk, and many others are constantly cropping up, in addition to the details involved in fitting the production plan to available equipment, men, and materials. In this entire area the information at the command of the cost accountant is, as indicated by the present author, an essential factor in informed decisions.

IN its broadest sense, production planning is a method used to develop production programs which are based on known or anticipated sales demands so that available manufacturing facilities are used most effectively and the best profit position is obtained. Very frequently, because the phrase "production planning" is applied either to a method of management or to a unit of the organization or else to the formal plans that result, misconceptions exist with respect to the actual field of production planning.

Perhaps clarification would be in order here. It is immediately apparent that all the departments of a manufacturing organization must be parties to the production planning effort. The sales, manufacturing, engineering and financial departments and their subdivisions must contribute their knowledge and thinking to the planning job. At top management levels, it is a series of functions concerned with the balancing of the company's over-all manufacturing operations with the indicated sales requirements as determined through market analysis. At operating levels, it is the control mechanism immediately concerned with the day-to-day production of finished goods.

Field Estimates and Dollarization of Unit Sales Forecast

Let us examine the two levels separately. First, let us consider the top management level. The over-all planning begins with a market forecast. It is virtually impossible to undertake any sort of

planning program without a few targets, and the more refined the analysis the more opportunity for success in the development and execution of the plans. In our particular case, the scope and detail of the forecast are very extensive. We manufacture a very broad line of oil field drilling and pumping equipment; gas, gasoline, diesel, and steam engines; steam and power pumps; derricks; and a host of specialty items related to the business of extracting oil from the ground and refining it for ultimate consumption. We do business through approximately 100 outlets in the form of retail stores and sales offices. From these frontiers of our business—which extend from New York to California and from Canada to Mexico, as well as to many foreign fields—we gather the sales forecast opinion of the men actually engaged in the selling. We use this method as our basic pattern for developing our future requirements although other approaches to the problem are also used, such as index and sales curves, as signposts to indicate changes in sales volume that may be expected.

The total anticipated volume of each product is the sum of the individual estimates of the areas or districts in which the product is to be sold and is determined by using past sales as a guide and field salesmen's estimates of future requirements in light of customers' plans and developmental activity. We regard these estimates highly as representing the kinds of equipment and machinery that will be needed and the number of each that it is expected will be sold in any given forecast period. However, we are not unmindful that salesmen are naturally optimistic creatures whose estimates often reflect the quantity they wish they could sell rather than what they will actually sell. To insure the proper amount of objectivity, the forecasts are translated into dollars by our cost accounting staff and are related to the dollar budgets established for each sales district and division for the period during which the sales will presumably be made. This is the first major contribution by the cost accountant in our over-all planning program. Such a dollarization provides an inescapable tie between the sales expectancy and the expense required in doing that particular volume of business and, in consequence, has a sobering influence on the unit forecasts of machinery and equipment sales.

Over-all Manufacturing Program

From these item forecasts, which are prepared on a quarterly basis, we in the production planning organization undertake the

development of over-all manufacturing programs for our four producing plants. The choice of point of manufacture of product items is not of too great consequence with us since our product line divides itself rather cleanly among our four manufacturing units. However, it is significant and should not be passed without notice that, where multiple choice of facilities for production is a possibility, the final determination of the placement of production orders and the over-all balance of the manufacturing program is dependent on the relative manufacturing costs at each plant involved. This determination is clearly a product of information developed by the cost accountant.

In programming our plants, the production plans are laid down for a twelve-month period in the future, based on known capacities at different operating levels. We strive in the development of our over-all plans to provide the equipment and machinery in the necessary volume to meet the sales requirements and maintain the field inventories at a level enabling four turns per year. This is not always possible, due to production requirements dictating the necessity for a greater quantity of manufacture at a given time in the interest of over-all lower production costs, in which case our inventories are understandably high for a given period. There is also the ever-present hazard of rapidly shrinking markets from unforeseen causes, with a consequent bulge in inventory through inability to stop manufacturing on extremely short notice. We feel confident, however, that as our forecasting techniques improve we can expect reasonably close attainment of our goals.

Testing the Profitability of Planned Production

The over-all plans thus developed are evaluated by the cost accountant in terms of expected dollar realization by the application of prevailing unit costs and selling prices, product by product. Here, again, is a major contribution to the problem of production planning by the cost accountant. This comparison provides for management's attention an illuminating picture of those products in the line which are profitable, as well as those yielding unsatisfactory returns, and points the need for further investigation into the cost and profit picture of certain items or lines to assure an adequate realization.

Such reviews can and do frequently lead to detailed engineering analyses of the design features of a particular product or special studies with respect to manufacturing methods to achieve a lower

production cost. The comparison also affords management an opportunity to correct selling prices within the limits set by the competitive conditions of the market. It provides a basis for determining the desirability of continuing or discontinuing various products in the line and points the way to a better balanced production plan through the elimination of manufacture on marginal facilities. It stimulates improvement in design and reduction or elimination of features which keep costs and selling prices high. The importance of these contributions of the cost accountant to the field of production planning cannot be overemphasized.

Opportunities in the Market

It sometimes occurs, in the analysis of the market, that items of equipment or machinery beyond the scope of our manufacturing facilities offer a rich opportunity for further penetration of a market or point up the necessity for extending the line or bridging a gap in a given equipment series. If such a situation arises and it is decided to enter the field with a piece of equipment or machinery in this category, we rely again upon the cost accountant for the information necessary to make an intelligent determination of the probable consequences. The engineering department develops the necessary design in keeping with the requirements to be met competitively and the cost accountant determines an indicated cost, assuming that manufacture would be performed on our facilities. Appropriate allowances are made for the operations which exceed the machine tools of our plants, and a synthetic cost of the completed unit is then established. With this as a bench mark, we are in a much more favorable position than otherwise would be the case for the negotiation of a subcontracting arrangement with an outside concern and can determine with a fair degree of accuracy what our competitive situation, as well as our net realization on the arrangement, will be.

Similarly, we are sometimes confronted with the commercial requirement of meeting an available market which we cannot satisfy with our maximum production. In these instances, we again resort to information developed by the cost accountant to assist us in the consummation of mutually agreeable subcontracting arrangements for the quantities needed in excess of our capacity. With an accurate product cost, since in most cases the item for which we are negotiating is a piece of equipment of our regular manufacture, we can conclude agreements for as many or as few as we

need to meet the situation and have a clear conception at all times of the impact such arrangements will have on our over-all realization. We may also enter into an arrangement wherein the subcontract is simply to satisfy a demand which has resulted from an overload on a given facility—say, for example, the foundry. With the cost information made available to us by the cost accountant, we can confine our outside procurement to any part of a given assembly which we need or we can procure the entire piece of equipment.

Periodical Check on Sales and Production

When the over-all production plans have been carefully examined in the light of all considerations, they are then presented for execution to the manufacturing units. Naturally, adjustments must be made here and there to exactly accommodate the program to the manufacturing facilities. After such adjustments, the plans are accepted and the cycle of manufacturing is begun. The effectiveness of the plans is subject to continuous review through comparison of planned versus actual results. Sales are observed in relation to forecasts and manufacturing output is examined in the light of planned schedules. Inventories are subject to monthly review, both with respect to balances by significant product classes and turn rate. Through information provided by the cost accountant, we are kept continuously aware of the changes in inventory balances as they are affected by the factors of sales volume, manufacturing experience, and planning accuracy, and we can determine the underlying causes for the shifts, whether they be deviations of forecast from actual sales or differences between scheduled and actual production.

Monthly reports furnished by the cost accountant of sales by product groups, together with quarterly reports of sales by product groups by district and division, showing gross profit by product classes, are invaluable aids in determining appropriate action with respect to the over-all plans. Any glaring deficiencies in sales forecasts can be readily interpreted into modifications in basic manufacturing plans to meet unexpected changes. The cost accountant provides us with quarterly reports comparing sales and inventories by districts by product classes, monthly reports of inventories by divisions, and monthly analyses of works inventories showing work in process, finished goods, raw materials, and stores and supplies. By the proper use of these reports we are

enabled to take corrective action in our over-all plans in time to avoid disastrous production mistakes.

Inventory Control—The Service Parts Problem

In the oil country supply business, inventories are a must. They are the backbone of our business and, since our inventory investment represents approximately one half of the total investment in the company, it is readily apparent that the necessity for inventory planning is coupled with the necessity for production planning. The two cannot be divorced. There are many, many facets to the problem of inventory planning and inventory control but, in the interest of restricting the length of this article, I shall touch on only one or two as examples of the part played by the cost accountant in this important phase of production planning.

Machinery and equipment of the kind we manufacture is ruggedly built, but it gets hard usage in the field. Hard usage leads to repairs. It is an accepted fact that the reputation of an equipment maker rises and falls on his ability to service his equipment after it goes into use and the oil field equipment fraternity does not vary from this pattern. Consequently, we strive to keep our inventories of spare and repair parts properly located and adequate in quantity to enable the sales organization to effectively service the trade. When planning our equipment production programs, we give thought and consideration at the same time to the needs for the expendable parts of the equipment, so as to permit the most economical plant operation. To do this, we obtain from our field points a detailed estimate of the probable six months' requirements for each part for each piece of equipment of our manufacture and fold these quantities into our authorizations for manufacture of total units of equipment.

Effects of Engineering Changes in Parts Specifications

The parts are made along with the units of equipment and are delivered to the field for distribution to the various areas where needed. At this juncture, everything would be fine if other influences were not at work. However, the forces of change are always at work and the desire for improvement being the constant prod that it is to any engineering department, things do not remain static for very long. The design engineers are always seeking ways and means to improve the performance, the appearance, or the competitive characteristics of equipment. This urge produces

changes which may be only in the shape of an item or the material from which it is made but which will improve its utility or lower its cost. Perhaps the piece was previously made of a casting. Now it is to be made of a weldment. Perhaps it was formerly made from forging and now is to be made on the automatic screw machines from cold rolled steel. Such changes can have a profound effect on inventory if the outstanding investment is as sizable as that of our parts inventory.

Where interchangeability between the old and new part is not affected, the problem is not so serious, but where the new part —for one reason or another—renders the superseded part obsolete, there are many considerations involved. Often there are significant cost savings inherent in the use of the new part design. In such cases, its introduction should be made as quickly as possible to capitalize on these savings. Opposed to this, there are the stocks in the field of the previously manufactured part which must be considered before any precipitous course of action is followed. Through the cost accountant, we are able to determine the extent of our current inventory investment in this particular part and the cost savings to be expected in connection with current and future production of the redesigned part. We can thus arrive at an intelligent decision regarding the appropriate date on which to authorize the introduction of the modified part into production. We can protect the inventory investment we have and yet take full advantage of the savings to be realized from the improved design by balancing the dollar effect of the change in manufacturing methods against our current investment in parts.

Competition in the Replacement Parts Market

Another example of the cost accountant's role in production planning as it relates to inventories is somewhat similar but involves the class of spare parts which is highly expendable and readily suited to relatively simple machine operations. It is the type of part that is generally low in cost, is required in high volume, and is replaced frequently. This type of part is naturally highly competitive in price and is extremely attractive to specialty manufacturers who possess the proper equipment for its manufacture. Typical of this type of part are pistons, piston rods, valves, and liners for various sizes and makes of power slush pumps. These are parts that are movable. Hence they wear

rather quickly and, being relatively simple in character, are easily manufactured.

In planning our inventory of this class of part, we sometimes find ourselves in the position of having provided excessive quantities as a result of an invasion of the market by a small independent organization whose price makes our stock very slow-moving. Since it is not likely that we will undertake manufacture of similar parts for competitive makes of pumps, we can determine through the cost accountant our best cost based on our own known volume and examine this in relation to the selling prices of the specialty manufacturer. If it appears, as it sometimes does, that because of the potential volume open to them, the specialty house is capable of producing and marketing their product at a lower price than our best cost situation would permit, it becomes apparent that our proper course of action is to buy, not make, assuming that the quality of each product is comparable. Thus, one more phase in planning of our production is made possible through information developed by the cost accountant.

Planning and Control at the Plant Level

It was stated at the outset of this paper that there are two distinct levels of planning, the top management level and the operating level. We have reviewed briefly the management level, including inventory planning and the part played therein by the cost accountant. We now come to the function of production planning at the plant level. The primary function of the plant planning and control group is to fit the over-all production program to the available facilities in such a way as to attain the lowest cost of manufacture and at the same time to maintain production at as near a uniform level as possible. At the plant level, production planning is generally agreed to encompass three major activity groups: scheduling, dispatching, and control.

In our type of manufacturing, scheduling is the responsibility for fitting the over-all production program to the facilities at hand. To do this requires the breakdown of each unit of equipment to be produced into its many components or parts and the determination of the required machine hours, based on time values established for each of the operations involved. These standards are engineeringly determined amounts of time that a given operation or job should require under normal operating conditions and are so established by the industrial engineering department as to reflect

an attainable degree of plant efficiency and operating performance. As conditions warrant, the standards are revised to reflect changed methods, processes, materials, prices, equipment, facilities, or the need for correction of out-and-out errors.

Scheduling entails also the development of the necessary man hours involved in execution of the schedule where machine loading is not necessary. It includes the determination of quantities to be produced on stock orders or the requirements of manufacturing spares for items of high manufacturing risk and comprehends the establishment of finished parts stocks for satisfactory assembly operations. To do this effectively requires reliance on the cost accountant for much of the basic information, such as setup costs, machine rates, direct labor and material costs, and overhead or burden charges.

In establishing the monthly production schedules, the plant planning responsibility loads the various work centers on the basis of the accumulated hours required for production of the individual components. Administration of the scheduling (and control) function of production planning is aided by the monthly operating budget (and report of performance) as prepared by the cost accountant. This is determined from standard hours produced in the month and reflects what was done against what should have been done. The extent of departure or variation from the expected is noted by the reasons for the variance. This fixes the responsibility.

Under dispatching, we include the responsibility for control of production in the manufacturing departments. The dispatcher works with the timekeeper and sometimes is the timekeeper. Dispatching also includes maintenance of direct material records, the release and delivery of raw, semifinished, and finished material, and intraplant transportation of materials and products.

Finally, through the cost accountant, control of production becomes control of plant inventories. This is facilitated by the establishment of inventory standards for active raw material, work in process, and finished parts inventories based on the normal manufacturing cycle for the items on the production schedule. Consideration is also given to inventories beyond plant control which may have resulted from engineering changes, over-all production program cutbacks, and standby spares required for sales purposes. In addition, under the function of control, the plant

planning unit maintains order progress and order service records and adjusts the production schedules in keeping with shifting requirements.

Production Planning Has Frequent Need of Cost Accounting

This article has touched briefly in a number of directions on the requirements which production planning, as a function, places on the cost accountant if full use of what he has to offer is to be made. For the sake of emphasis, I should like to review again the principal points at which the paths of the production planner and cost accountant cross. Primarily cost accounting is concerned with the supplying of information helpful in the control of the manufacturing activities and production planning is the control mechanism of a manufacturing organization which puts this type of information to use. As we have seen, to properly execute the planning function, there is a constant requirement for current and accurate cost information in connection with manufacturing activities. There are frequently recurring requirements for special cost studies and special cost reports to permit the proper evaluation of planned activities. There is also the ever-present need for current and accurate cost information in regard to inventories in various breakdowns by product class and distribution.

In a business such as ours, which has a strong merchandising element, there is always the requirement of evaluating the market in relation to our ability to participate in it and, as a guide to over-all planning, a continuous comparison between where we expected to go and where we are. We have the constant problem of determining the make-or-buy situation and we always have the problem of machine utilization to maximum effectiveness. All these, and infinitely more, are the points at which the highways of planning and cost accounting cross.

AN OUTLINE OF A PRODUCT DEVELOPMENT BUDGETARY CONTROL PROCEDURE

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It is agreed that conduct of product development work must be continuous, well-directed, and thoroughgoing if it is to serve its purpose. That it must have the limitations imposed by the company's situation is also an accepted viewpoint. The present article outlines the procedure through which product research and development are controlled in a large company in which control of this activity is centered in a top management committee.

RESEARCH expenditures are, in a very real sense, investments in the long-term growth of a business. The results of research as manifested in our national industrial growth, the types of research programs, volume of research expenditures, and industry ratios are, in themselves, interesting and profitable studies. In this paper, we address ourselves to perhaps a more prosaic but none the less important side of the conduct of research projects, the procedural aspects of budgeting and accounting for product research and development expenditures, using the material afforded by the practices of Allis-Chalmers Manufacturing Company in its General Machinery Division.

The company employs over 33,000 persons, operates nine manufacturing plants, 43 branch houses, and 55 district sales offices, and has numerous dealers and distributors located in agricultural and industrial centers of the United States and many foreign countries. The company has two main divisions, the Tractor Division which manufactures and distributes agricultural and industrial tractors, harvesters, plows, cultivators, and a host of allied equipment and the General Machinery Division, among the largest manufacturers of electrical and diversified capital equipment. The latter division, on which this paper is based, manufactures—in addition to electrical products—steam turbines, gas turbines, hydraulic turbines, flour milling machinery, sawmill machinery,

ALLIS-CHALMERS MANUFACTURING COMPANY
GENERAL MACHINERY DIVISION

SECTION _____ **REQUEST FOR DEVELOPMENT AUTHORIZATION**

DEPARTMENT _____ WORKS _____ DATE _____ 19__

DIVISION _____ ORDER PRODUCT CODE NO. _____ ESTIMATE NO. OR _____ (MUST TO BE FILLED IN) APPROPRIATION NO. _____

DESCRIPTION

REASON FOR REQUEST

ARE INVENTIVE IMPROVEMENTS PROBABLE?

ARE EXISTING PATENTS INVOLVED?

INFORMATION FOR REQUESTS TO CLOSE COMPLETED AUTHS. OR FOR SUPPLEMENTS REQUESTING FUNDS TO CONTINUE		AMOUNTS PREVIOUSLY AUTHORIZED			TOTAL OF THIS REQUEST (DEDUCTIONS ON RIGHT)
			DATE	AMOUNT	
TOTAL AMOUNTS AUTHORIZED		ORIGINAL AUTH.			
EXPENDITURE TO (DATE AND AMOUNT SUPPLIED BY ACCT. DEPT.)		SUPPL. A			
NET BALANCE OR OVEREXPENDITURE		SUPPL. B			
EST. AMOUNT TO COMPLETE		SUPPL. C			
NET AMOUNT REQUIRED TO COMPLETE		SUPPL. D			
QUARTER IN WHICH EXPECT TO COMPLETE		Total Amounts Prev. Authorized			

INCLUDED IN SALES ORDER NO. _____ AMOUNT _____

DISTRIBUTION OF CHARGES (MUST TO BE FILLED IN) $ _____ $ _____ $ _____

DATES	APPROVALS	DATES	APPROVALS
_____ 19__	_____	_____ 19__	_____ GENERAL MANAGER
_____ 19__	_____	_____ 19__	_____ DEPARTMENT MANAGER
_____ 19__	_____ CHIEF ENGINEER	_____ 19__	_____ VICE-PRESIDENT MANUFACTURING
_____ 19__	_____ SECTION MANAGER	_____ 19__	_____ EXECUTIVE VICE-PRESIDENT
_____ 19__	_____ BOARD MEMBER	_____ 19__	_____ VICE-PRESIDENT & COMPTROLLER
_____ 19__	_____ GENERAL PATENT ATTORNEY	_____ 19__	_____ PRESIDENT

COPY TO _____ (ADD SUPP.) DEVELOPMENT AUTHORIZATION NO. _____ SUPPL. NO. _____

EXHIBIT 1

cement mills, blowers, condensers, pumps, mining equipment, texrope sheaves, water conditioning, and hundreds of other products.

Product Development Setup

The company has the divisional organization common to corporations and, specifically among the divisions, an Engineering Development Division, headed by a vice president. The vice president in charge of this division is chairman of the Development and New Products Committee, membership of which is composed of the executive vice president, vice president and comptroller, general works manager, product department manager, and the general patent attorney.

The engineering development division embraces the Product Engineering Section which includes the functions of engineering research and design and development of new products. It may, in addition, be authorized to carry such development into pilot manufacturing operations and market development. It may be authorized to investigate existing product lines, make competitive tests and recommendations for improvements, or to assume development responsibility for products related to existing lines which may appear burdensome to a department from the standpoint of financial responsibility, manpower limitations, or for other reasons.

Classification of Development Expense

Research and development expenditures, while distinct in that one logically precedes the other, are viewed as the same for purposes of this discussion. We do, however, recognize two specific classifications of research and development expenditure, as follows:

1. *New products,* defined as those products which are either new inventions or products, already manufactured by other companies, not heretofore undertaken by us.
2. *Inventive improvements,* comprising improvements made to our existing lines of product, whether or not the improvements are patentable.

It may be commented that contract engineering expenditures incurred in the development of a special product for a specific customer are not considered as development expense but rather as cost of sales of the specific order.

Request for Development Authorization

Our starting point is the Request for Development Authorization (Exhibit 1) which applies to any development expense project or item beyond $200 works cost. These require the approval of the development and new products committee and the president. The requests are prepared on the following basis:

Marketable machine—If an experimental machine is to be manufactured and later sold, the development authorization should cover all prospective expenditures for engineering, drawings, patterns, tools, and manufacturing of the experimental machine, less a conservative carrying value.

Nonmarketable machine—When the building of an experimental machine representing a new class, line, or type of standard product is contemplated and the experimental machine will not be placed on the market, the development authorization must include the works cost of the machine.

Development cost partly recoverable—When a contemplated expenditure is partly recoverable in the sales price of a machine, the request for development authorization is issued for the full amount of the expenditure, including that part to be recovered in the sales order. The amount for recovery in the sales price will be noted on the development authorization by the engineering department.

For whatever class of item issued, the request for development authorization includes, by summary on the reverse side of the form, estimated costs of engineering, drawings, testing and experimenting, temporary patterns and tools for the development of a new or the redesign of an existing product. Additional data, listed below, also appear in question form on the reverse of the request, and are of distinct value to the development and new products committee in its consideration of the project and have a most important bearing on approval or disapproval:

1. Probable price obtainable.
2. Time required to develop first machine.
3. Probable sales first year after development.
4. Probable sales per year thereafter.
5. Estimated commercial cost of subsequent machines based upon probable volume of sales and use of tools and equipment justified by such sales.

6. Extent to which field is now occupied or controlled by competitors.
7. Value of additional machinery required.
8. Value of permanent tools and fixtures required.
9. Amount of development expense chargeable to contracts booked or pending.

When the contemplated development project concerns a new product rather than an inventive improvement, the complement of data called for by the request is augmented by a market research study. Nothing is left to chance in these early considerations because it is conceivable that a project, once approved, may require additional expenditures so that the original investment may be salvaged. These outlays may run well beyond the level which, if originally known and evaluated, would have caused rejection of the request.

Information for Development and New Products Committee

The development and new products committee at its regular meeting during the final week of each quarter passes on the development budget for the ensuing quarter. The committee, in establishing the over-all amount of the development budget, adheres generally, although not rigidly, to an amount determined as a percentage of the volume of orders booked. It is recognized that modification of the ratio may be desirable in periods of reduced or increased volume. Three reports are prepared for the use of the committee in making its review, of which the third brings the new requests for development authorization before the committee. The open authorizations and their status are taken up first.

In Exhibit 2 is shown the summary listing of existing authorizations by authorization number, description, amount authorized, and amount expended. It requires also certain additional information of the department for which the authorization was approved. This information includes indication in columns provided of estimated expenditure for the ensuing quarter, the quarter in which development will be completed, further authorization (if any) which will be needed, whether a patentable improvement appears probable, how the product will be distributed (through district offices, existing dealers, or new outlets), type of product (standard development, new product in existing line, or new product of new type),

Form 3961-S-3
Printed 3-47

TO: DEVELOPMENT AND NEW PRODUCTS COMMITTEE

DEVELOPMENT BUDGET PROPOSAL

_____QUARTER, 194____

PAGE____ OF____

DATE

OPEN DEVELOPMENT AUTHORIZATIONS

DEVELOPMENT AUTHORIZATION NUMBER B.A.-	DESCRIPTION — SUBJECT OF AUTHORIZATION, IDENTIFY BY SIZE, TYPE, CAPACITY RATING, WHEREVER POSSIBLE	CLASS (DO NOT FILL IN)	AMOUNT AUTHORIZED	REPORTED EXPENDED TO (FROM COST DEPT.)	ESTIMATED EXPENDITURE FOR COMING QUARTER	IN WHAT QUARTER IS DEVELOPMENT EXPECTED TO BE COMPLETED: DESIGNING AND DRAWINGS	IN WHAT QUARTER IS DEVELOPMENT EXPECTED TO BE COMPLETED: TOOLING AND PATTERNS	WILL FURTHER AUTHORIZATIONS BE REQUIRED FOR: DEVELOPMENT	WILL FURTHER AUTHORIZATIONS BE REQUIRED FOR: TOOLS & PATT.	DOES A POTENTIALLY INFRINGEMENT APPEAR POSSIBLE	HOW WILL THIS PRODUCT BE DISTRIBUTED: THRU DISTRIBUTORS OFFICES	HOW WILL THIS PRODUCT BE DISTRIBUTED: THRU EXISTING DEALERS	HOW WILL THIS PRODUCT BE DISTRIBUTED: NEW OUTLETS REQUIRED	TYPE OF PRODUCT: STD. DEVELOPMENT OR IMPROVEMENT	TYPE OF PRODUCT: NEW PRODUCT IN EXISTING LINE	TYPE OF PRODUCT: NEW PRODUCT OR NEW TYPE	MAJOR INDUSTRY FOR WHICH PRODUCT IS INTENDED, AND PRODUCT CODE

SECTION DEPARTMENT WORKS SYMBOL

Please attach a brief statement on Progress Report Form 3962 for each item listed.

EXHIBIT 2

TO: Development & New Products Committee

PROGRESS REPORT FOR DEVELOPMENT BUDGET PROPOSAL _____ Quarter, 19____ Page____ of____

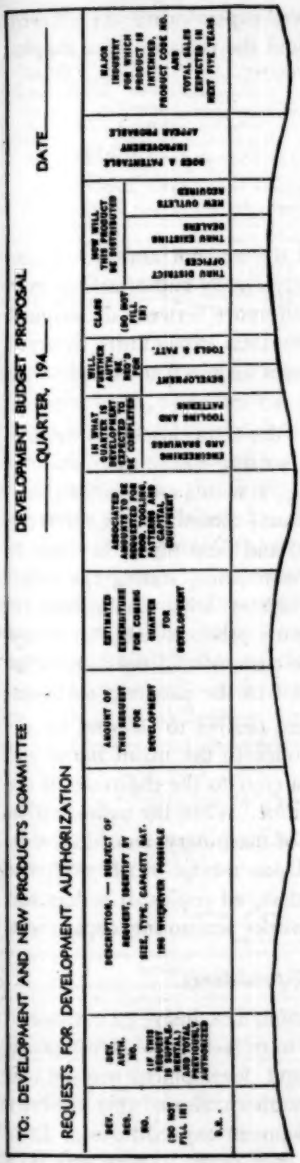
Department_____ Section_____ Works_____ Symbol_____ Date_____

Authorization No.	**Insert a Brief Progress Statement for Each Item Listed:** The type of information that is of most assistance to the Committee in considering requests includes (a) Degree of completion of engineering, drawings, test units, shop tests, field tests, tools and patterns, (b) Expected application of product, (c) Number of sales to date, (d) Plans for continuing development, (e) Information as to similar development by others, (f) New trends in demand or uses for product, (g) patent developments.

EXHIBIT 3

TO: DEVELOPMENT AND NEW PRODUCTS COMMITTEE

DEVELOPMENT BUDGET PROPOSAL



TO: DEVELOPMENT AND NEW PRODUCTS COMMITTEE — DEVELOPMENT BUDGET PROPOSAL — DATE

REQUESTS FOR DEVELOPMENT AUTHORIZATION — QUARTER, 194

DEV. REQ. NO. (DO NOT FILL IN)	DEV. AUTH. NO. (IF THIS REQUEST IS APPROVED, ENTER NEXT AVAILABLE AUTHORIZATION NO.)	DESCRIPTION, — SUBJECT OF REQUEST, IDENTIFY BY SIZE, TYPE, CAPACITY RAT. ING WHEREVER POSSIBLE	AMOUNT OF THIS REQUEST FOR DEVELOPMENT	ESTIMATED EXPENDITURE FOR CURRENT QUARTER FOR DEVELOPMENT	ASSOCIATED APPROPRIATIONS REQUESTED FOR PROD. TOOLING, PATENTS, OR CAPITAL EQUIPMENT	IN WHAT QUARTER IS PROJECT EXPECTED TO BE COMPLETED		WILL PARTICULAR MFR'S NEED BE MET?		CLASS (DO NOT FILL IN)	HOW WILL THIS PRODUCT BE DISTRIBUTED			DOES A PATENTABLE IMPROVEMENT APPEAR PROBABLE	MAJOR INDUSTRY FOR WHICH PRODUCT IS INTENDED, PRODUCT CODE NO. AND TOTAL SALES EXPECTED IN NEXT FIVE YEARS
						ENGINEERING AND DRAWINGS	TOOLING AND PATTERNS	DEVELOPMENT	TOOLS & PATT.			THRU DISTRICT OFFICES	THRU EXISTING DEALERS	NEW OUTLETS REQUIRED		

EXHIBIT 4

and finally the major industry for which the product is intended and the product code.

Some of this data is also supplied the committee in narrative form on individual progress reports for each open authorization (Exhibit 3). The form calls for: (a) the degree of completion of engineering, drawings, test units, shop tests, field tests, tools and patterns, (b) expected application of product, (c) number of sales to date, (d) plans for continuing development, (e) information as to similar development by others, (f) new trends in demand or uses for product, and (g) patent developments.

The third report submitted to the committee is, as has been indicated, a covering report to new and supplemental authorization requests. It takes the form shown by Exhibit 4, with headings similar to those of Exhibit 2. With its consideration, the deliberations of the committee are complete and the budget as approved is sent to the president for his further approval.

Excess Expenditures

Authorizations are issued for specific purposes and no work, other than that originally contemplated, is done until a supplemental authorization has been

issued and approved. However, excess expenditures are allowed within the following limitations, without the issuance of a supplemental authorization:

Authorization for	
Less than $1,000.	20%
$1,000. to $5,000.	10%
$5,000. and over	5%

When expenditures have exceeded the amount authorized plus the excess percentage allowed, a supplementary authorization must be issued in an amount equal to the difference between the original allowance, exclusive of excess, and the total expenditure incurred plus any anticipated future expenditures required to complete the project.

Should the engineer of a department desire to close an authorization, he is required to give notice in writing to the sales, maintenance, and works accounting departments, with a copy to the chairman of the development and new products committee. A reference sheet closing the order is then issued and final report is made to the development and new products committee, stating the result of the work done under the authorization, what application (if any) of the results was made to company products, whether or not any part of the cost may be charged to customers' orders, and what patent information has been submitted to the patent department.

When the engineer of a department desires to suspend an authorization, he prepares a written notice to the maintenance and works accounting departments, with a copy to the chairman of the development and new products committee. When the authorization specifies patterns or the manufacture of machinery, an order reference sheet is issued on each order. Upon receipt of the reference sheets, authorizing the closing of orders, all copies of orders and specifications are forwarded to the works accounting department.

Accounting Record of Development Expenditures

All expense development authorizations (exclusive of customers' orders) and similar expense charged to miscellaneous development is charged monthly to the research and development account and apportioned to costs of products. The mechanics of this involve a special order number series for development expenditures of $200. and over to accumulate the total of each order. There may be a

ORDER RECORD

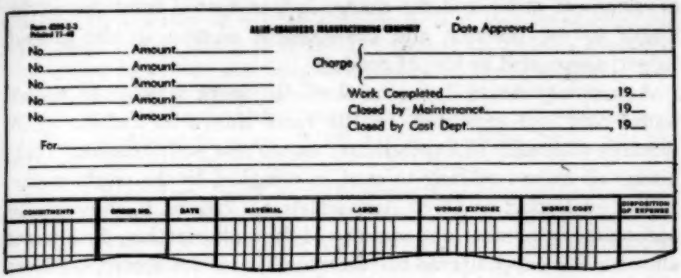


EXHIBIT 5

number of orders for one development authorization. The series, ten digits in all, identifies the expense as chargeable initially to the "interim account" on the works ledger. By the use of the product series, which is a part of the order number, development charges are identifiable by the line of product for which the expenditure was made and to which the charges are to be assessed upon final distribution. Expenditures of less than $200. on any one development for testing, experimental, research, and development work performed by the engineering department or by the manufacturing department at the request of the engineering department are classed as miscellaneous development when not specifically chargeable to a customer's order or covered by a development authorization. These miscellaneous charges are accumulated monthly by line of product and charged directly to the research and develop-

REPORT OF OPEN AUTHORIZATIONS

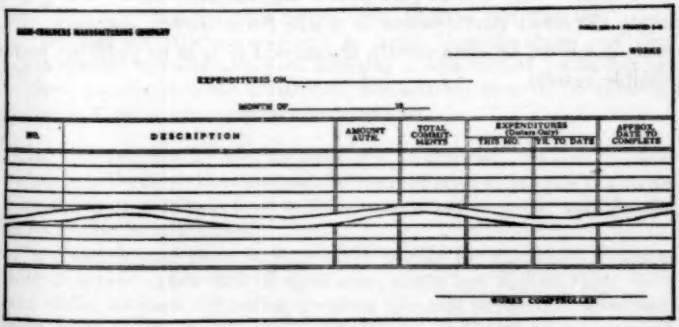


EXHIBIT 6

ment account. A progress cost is prepared each month for each development order and the charge is transferred from the works ledger to the research and development account in the general ledger, segregated by line of product.

A running record for control of the work is kept of orders issued and cost expensed, on the form shown as Exhibit 5. A monthly statement of expenditures on current authorizations, combining all orders relating to each, is compiled by the works comptroller on Report of Open Authorizations, Exhibit 6, showing the authorization number, the purpose of the authorization, the amount allowed, the expenditures for the month, and the accumulated expenditures to date. After receipt of notification from the engineering department of suspension or closing of an authorization, all orders issued against the authorization are costed and the authorization marked "Closed."

Conclusion

The greater portion of this paper has been given over to the procedural aspects of product development proposal, approval, review, and control. The lesser portion has dealt with the accounting records maintained. For present purposes, this emphasis is intentional. The accumulation of project costs on substantially a job-order procedure, with provision for grouping of minor items, is common practice in this area. What is perhaps less common is the existence of a management committee, such as our development and new products committee, holding reasonably frequent meetings and being provided with material on the basis of which to take critical note of projects completed, to appraise the status of those under way, and to give sound consideration to all new proposals. Product development is a life force in any company. It must, however, be competently channelled if it is to yield the best possible results.

Wage Incentive Standards as Costing Standards

In making a survey of current practices in labor cost accounting, the writer found that, in almost all cases which came to his attention, standards for wage incentive plans were being utilized as labor costing standards. The intent of this letter is to raise questions as to the desirability of this practice and its consequences—debit labor variances which "are common and sometimes substantial in amount." (N. A. C. A. Research Series No. 13, "Standard Costs for Costing Inventories," June 1, 1948).

Standard labor costs should be differentiated from production standards set up in conjunction with wage incentive plans, even though the latter may be used as a basis of standard labor costs. Standards of wage incentive plans are used to stimulate effort and to provide a medium for the calculation of wage payments. Standard labor costs pertain directly to the problem of costing products and the control of labor costs by management by means of labor efficiency and labor price variances.

Where a straight-piece work plan of wage remuneration is in effect, the standard pay per piece is often suggested as a basis for costing the product as well as a plan for rewarding employees. Some accountants modify the standard operating time as obtained from time studies to allow for fatigue losses, interruptions, and hard materials. Others would take delay and setup time to factory overhead. Despite the fact that some allowances may be made in these ways for nonstandard performance relative to time studies, some inaccuracy is unavoidable when the piece rate paid is used as a labor costing standard. Wage costs computed by applying occupational wage rates to standard operating time will tend to be properly charged against the product. However, labor costs arising from payments for holidays, minimum guaranteed annual wages, or social security taxes paid by the employer, obviously cannot be contained within the piece rate used as a medium of wage payment.

Standards of more elaborate wage payment plans, if used as standards for costing purposes, give rise to a number of problems, including the difficulties mentioned in connection with price-rate standards. "Standard Costs for Manufacturing," Stanley B. Henrici, McGraw-Hill Publishing Co., 1947, p. 56 indicates one of these in the following:

> "An interesting feature of the type of plan just described is the fact that the standard cost may be higher than the actual cost. But presumably the desirability of achieving a high rate of production has been considered in the differential rates and has been felt to outweigh the $0.15 increment in cost per standard hour.

The plan described by Henrici would tend to give rise, as a rule, to credit variances in the direct labor account. In terms of labor costs applicable to the product, higher costs than those actually incurred will be consistently charged to the product being produced.

Standards of wage incentive plans which provide for guaranteed minimum daily or hourly wages, such as the Halsey, Gantt, and Bedaux plans, when used as the standard for costing purposes, give rise to different labor variances when applied under varying conditions. Customary debit variances

would denote labor inefficiency relative to the standard of the plan in effect. The standard of any of these plans would not ordinarily charge product for actual costs incurred. When variances are treated as period costs, as is common practice, inventories, in so far as labor costs are concerned, will be charged for labor costs in terms of the standard of the wage incentive plan.

If products produced under either the Gantt or Bedaux plans are charged at the labor cost of work produced at standard rates, the result will be an undercosting of output as long as there are any workers producing below standard. That is, the costs charged to product will be less than the total wages paid. A similar result would be realized under the Emerson and Halsey plans if most workers consistently fell below the wage incentive standards.

Under any plan in which cost per unit decreases as the efficiency of the worker rises above standard, such as the Emerson and Halsey plans, the costing of product as if it were produced at standard will result in the overcosting of product when the bulk of the work is done at above-standard rates.

The operating standard set in a wage incentive plan is part of a program designed to get the best results possible from the labor used. It is a problem of labor management. The lower the standard is set, the larger will be the fraction of the total wage bill paid in the form of bonuses and premiums. There is no logical connection between this problem in labor management and the accounting problem of costing product. Any attempt to tie the standard cost for costing product to the wholly different kind of standard used in wage determination can only result in confusion.

The writer believes that in general there are but two approaches to the problem of measuring labor cost: (1) by means of the standard of wage incentive plans which standards may or may not allow for delay time, size changes, hard materials, etc., and which cannot allow for bonuses and premiums and (2) by means of predetermined labor cost standards based upon expected operating conditions.

The first approach represents a theory of standard costs which, as expressed by one writer, (Charles Reitell "Advantages and Disadvantages of the Standard Cost Plan of Accounting," N. A. C. A. Year Book, 1930) is a "shift of emphasis from product to performance." Control is centered in deviations of labor efficiency from a performance standard rather than deviations in labor costs of product. The second *in its use of labor cost standards* stresses control from the point of view of product costs and related problems of pricing. It allows for expected nonstandard conditions (nonstandard relative to the wage incentive plan). Its variances would represent deviations from expected efficiency or payments.

Costing in terms of the standard of the wage incentive plan in effect tends to ignore experience and expected actual conditions and may take hypothetical labor costs to inventories and hypothetical variances to profit and loss. A better procedure would be to establish labor cost standards in line with labor costs expected from the operation of the wage incentive plan under normal conditions for a particular year. More accurate costs of inventories and standard costs of product sold would result.

Contributed by L. J. BENNINGER, *St. Louis Chapter*

LEAVES FROM THE SALESMAN'S ORDER BOOK—A SIMPLIFIED ORDER AND BILLING ROUTINE

by WAYNE R. ARCHERD,
Assistant to Controller, Bethlehem Steel Co.,
Bethlehem, Pa.

The reduction of clerical effort involved in handling orders from the time the customer is sold until he is billed for the delivered article, is an objective in many companies, large and small. The author of this paper presents a simplified procedure in use in a small company and points out also its adaptability to larger operations.

THERE is outlined in this article the procedure followed by one small company in simplifying order and billing procedures. This company is a machinery manufacturing organization with assemblies and subassemblies necessary to produce its finished product. It also must maintain a stock of repair parts for repair of such of its product as may be sent in.

Writing and Acceptance of the Order

The simplification starts with the functions performed by the company's salesmen—approximately twenty—located in major centers, from which points they cover the entire United States. It has been found practicable to have sales order information provided to the home office by the salesman in the field through the use of an order book so arranged that he produces at one writing an original and three copies of each order which he takes. The order forms tell the salesman what shipping information and other pertinent data (such as the customer's purchase order number) he must secure from the customer and provides spaces for its insertion. The order is written in pencil by the salesman at the time that he secures it from the customer.

The original and duplicate of the order form are perforated so that they may be detached and mailed to the home office. If the customer has given the salesmen a purchase order, it is forwarded to the home office attached to the original and duplicate of the sale order forms. (In those instances where a customer mails his purchase order direct to the home office, the home office sales department locates the salesman's order to which it applies and attaches it thereto, or, if no sales order has been written in the field, a complete sales order set is prepared.) The triplicate, also perforated

for detaching from the order book, is given by the salesman to the customer for the latter's record. The fourth copy of the sale order is not detachable but remains in the salesman's order book at all times. Each salesman is identified by a symbol (although a number would serve the same purpose) and numbers his orders consecutively, prefixing the order number with his symbol. An example might be order number B-254, which would be the 254th order taken by John Doe, sales symbol B.

Upon receipt of the two copies of the order in the home office, they are routed to the sales department and a careful check is made to determine that no necessary information has been omitted. If the order is incomplete in any particular, the salesman or the customer is contacted and the missing information is added or any erroneous information is corrected before proceeding further with the order. (However, if the order is a "rush" order which must be produced in the shop and time is at a premium, a production order may be issued and production may be started before receipt of corrections if they are relatively minor matters.) One copy of the complete and correct order is retained by the sales department until shipment. It is kept in numerical sequence in an open order folder (generally one folder will suffice for each salesman) for reference in the event that the salesman or the customer refers to it prior to date of shipment. (If the system of using only one folder for each salesman's orders becomes bulky and unwieldy, the use of additional folders arranged alphabetically by customer or by major customer, etc., might prove practicable).

The other copy of the field order, after credit approval and credit terms, routing, etc., have been entered thereon, is forwarded to the billing division. The billing clerk, using this order copy, produces at one typing an original and seven copies of the invoice form, filling in the order number and date, the customer's name and address, the indicated shipping information, and the quantity and description of each item to be shipped. The copies so produced are for the following purposes:

Original and one copy to be held by the billing clerk until shipment has been made. These copies will be completed and used to invoice the customer.

One copy for sales department files (after shipment).

Two copies for accounting department (after shipment).

One copy to customer (home office acknowledgment of order).

One copy for shipping room (shipping record copy).
One copy to production manager (factory production or stockroom copy).

The last three copies are never completed as invoices but serve the special uses noted. The acknowledgment of the order is forwarded to the customer immediately. The copy for the factory (or stockroom) is forwarded to the production manager and the copy for the shipping room is forwarded promptly to that department. The original and the four remaining copies are retained by the billing clerk, together with his copy of the salesman's order, until he is advised that shipment has been made.

Today almost all customers' orders are filled by manufacturing to order. The factory production department, upon receipt of the production and stockroom copy of the invoice from the production manager, prepares whatever stores requisitions, purchase requisitions, and/or production orders are required and follows the manufacturing operations through to delivery of finished material to the shipping room. In the event that shipment is from stock, the stockroom must determine whether or not it is necessary to prepare a job order to produce for stock to rebuild inventories depleted by such shipment,

In those instances in which production has been carried out for the particular order, the production department notes on the production and stockroom invoice copy the date the finished material was delivered to stock or shipping room and files its copy in order number sequence. The shipping room holds its copy of the invoice form until it has received the material and has made shipment, at which time it enters thereon such data as the date of shipment, any items back ordered, any changes in routing, shipping weight, car numbers, etc., and makes any other necessary changes or additions to complete its copy as a manifest. It then prepares necessary bills of lading, shipping notices, etc. and, when this has been completed, it forwards this manifest to the billing clerk.

Invoicing Routine

The billing clerk, upon receipt of this notice of shipment, completes the original and the four copies of the invoice which he has been holding by applying the invoice number, date of the invoice, date of shipment, car numbers, shipped weight, unit prices, extensions, etc. The original and one copy of the completed invoice are then mailed to the customer. The sales department receives

a priced copy for its customers' file. However, the sales department may decide to note the invoice number on the salesman's order copy that it has been holding and to maintain a numerical file of the completed invoices and an alphabetical (by customer) file of the orders.

The remaining two copies of the invoices are for the accounting department. One of the accounting department copies is used by the accounts receivable ledger clerk as a posting medium and the other copy by the cost department for cost distribution. The billing clerk files the manifest he received from the shipping department with his copy of the salesman's order, noting thereon the invoice number for ready reference. His files are maintained by invoice number; the accounts receivable clerk files his invoice copies alphabetically by customer; and the cost department maintains its files by production order number or such other sequence as it has determined is most useful to it.

Adaptability of Procedure to Large Company Operations

Where any type of duplicating equipment is available for producing multiple copies, the procedure outlined above may be generally followed by large companies. A greater number of copies of the order and related documents may be produced through typing master sheets in duplicate or triplicate, depending upon the requirements at the sales office or in the order department. For example, at the time the masters were first produced (in such instances), there could be provided from a single master any required number of factory order and production department copies as well as such related forms as the acknowledgment of the customer's order, etc. A second master (a duplicate copy of the above) could be used by the shipping room which, after shipment had been effected, would enter on such copy in hectograph ink, the date and quantities finally shipped, together with shipping information, and would produce therefrom the desired number of shipping notices, packing lists, bills of lading, trucking receipts, and other required documents. Finally, a third master (triplicate copy) could be used after shipment by the billing clerk for the inclusion of shipping and pricing information and extensions of prices. Again the desired number of customers' invoices and sales department, accounting department, file and ledger copies, etc., could be produced therefrom.

THE PROCEDURAL REQUIREMENTS OF FIELD WAREHOUSING

by PETER C. JUNG,
Assistant to the Operating Controller, Marathon Corp.,
Menasha, Wis.

The procedural characteristics—and some others—of making sales to customers via field warehouse arrangements, when these are appropriate, are given informative description in this presentation. Included in the matters treated are the pricing of merchandise withdrawals, maintenance of insurance on field warehoused stocks, and other special requirements.

SIMPLY stated, field warehousing is a specialized warehousing function accommodating the storage of goods on the premises of the owner, ordinarily a distributor who has taken title to the merchandise but has not as yet paid the manufacturer for it, under the custodianship of a bona fide warehouseman, a disinterested party, who issues negotiable and nonnegotiable warehouse receipts. "The storage of goods on the owner's premises" is a technical concept and does not require a moving of the goods from the point of intended sale to another place of storage but does require physical possession by the warehouseman and separation between the owner and his goods. It is necessary for the field warehousing company to lease from the owner the premises in which the goods are stored so that it has a legal right to the possession of such space.

Purposes of Field Warehousing

The principal objectives of such an arrangement are readily understood. For one, field warehousing is a credit instrument applied by the larger companies to increase the purchasing power of distributors and other customers who have proven themselves capable of carrying a greater load than is indicated by their credit ratings. A manufacturer can ship goods knowing that they will be paid for in full, either on delivery to the distributor or ultimately on delivery to the consumer. There is no risk to the shipper in either case because physical possession of the goods can be arranged to pass to the customer only in proportion to his payments. Field warehousing is also used to reduce the risk involved in sell-

ing standard stock products to marginal accounts by permitting title to the merchandise to pass to the buyer, thereby establishing his liability to pay, but withholding possession pending payment.

Only standard products are appropriate to be shipped to field warehouses because of their firmer resale or more likely salvage values and the ease with which they can be disposed of in the local market in the event of a termination of the agreement due to unforeseen circumstances. Ordinarily the customer pays the warehousing cost and this feature may well aid the seller, within bounds of business prudence, to manufacture and ship merchandise in advance of delivery dates specified by buyer where service and production schedules require.

The customer ordinarily selects a bonded field warehouse acceptable to the manufacturer. The seller carries fire and extended insurance coverage for the full value of the merchandise on hand in the field warehouse and charges the buyer with the cost, usually on a monthly basis.

Processing Orders and Pricing Shipments

A bona fide sales order complete in all ordinary respects is signed by the customer, together with a special supplemental contract covering the specific agreements pertaining to the field warehousing aspects of the transaction. The company attorney or outside legal counsel should be consulted so that the supplementary contract will be properly drawn up to protect both the buyer's and seller's interests. These contracts form the basis and the beginning of the field warehousing program. A new and separate agreement must be processed for each order. The orders are acknowledged to the buyer and processed in the same way as all others except that additional copies of the original order are prepared for the following uses:

1. One copy to the credit department for the field warehouse follow-up file. (One file for each order for each buyer.)
2. Two copies to the insurance department.
3. Two copies to the field warehouse company as notification that the agreement has been signed by the buyer and that the field warehousing arrangements should therefore be completed at the buyer's premises.

Shipments made from the manufacturer to the field warehouse are tentatively priced at current prices in effect at time of shipment

for the total quantity shipped. Withdrawals by the buyer are priced and paid for at current prices in effect at time of withdrawal for the quantities covered by each withdrawal. At end of each month an adjustment is made, giving buyer the benefit of the quantity price for total withdrawals made during the month instead of pricing each withdrawal separately at a higher small-quantity price. As each shipment to the field warehouse is completely withdrawn, the buyer's account on the books is adjusted to reflect the difference between the price originally charged and the final price of all withdrawals.

Special Actions in the Credit and Billing Departments

At the time of shipment to the field warehouse of the merchandise ordered, the credit department notifies the home office of the field warehousing company, informing them of the quantity and kind of merchandise shipped and its destination. The letter also contains instructions regarding the release of the merchandise to the customer and is accompanied by a price list covering the prices in effect at the various quantities usually withdrawn. As already mentioned, the credit department maintains a separate file for each order for each buyer. This file provides for information to:

1. Report monthly to the insurance department:
   (a) Original amount shipped to each field warehouse.
   (b) Withdrawals during the month.
   (Both of the above expressed in dollars only.)
2. Serve as a basis to make the necessary price adjustments to each buyer's account, referred to above.

At the time of shipment of merchandise to the field warehouse, the billing department must provide, in addition to the ordinary number of copies of invoices, certain additional copies:

1. One copy for credit department files.
2. Two copies to the home office of the field warehousing company.
3. Two copies to the insurance department.

Insurance Coverage on Field Warehoused Stocks

The insurance on merchandise stored in field warehouses throughout the country can be covered by a blanket policy known as a "general cover contract." This type of policy provides automatic coverage up to a predetermined maximum amount at all or

any locations as soon as merchandise is placed in the warehouse. The value of merchandise for insurance purposes is the invoice price at time of shipment to the warehouse. The coverage provided comprehends fire and extended coverage similar to that provided in the standard fire and extended coverage contracts.

The two copies of the buyer's order for merchandise to be shipped to the field warehouse, which are sent to the insurance department, form the starting point for placing coverage. The legal description of the property where the merchandise is to be stored is obtained from the buyer and is recorded in the insurance records. A copy of the order, together with this legal description is sent to the insurance company with an estimate of the maximum coverage required at any one time during the policy year (which is on a fiscal year basis). As mentioned above, the coverage is automatic. However, the order copy and property description are sent out so that the insurance company can have the premises inspected and also determine the premium charge, as each location is rated separately. When the shipment is made to the field warehouse, a copy of the invoice to the buyer is sent to the insurance company, attesting to the shipment of the merchandise.

At the end of each month a report is sent to the insurance company, listing each location and the insurable value at each location. The insurance company then prepares a premium statement covering the insurance cost for the month for each location separately. The insurance department furnishes the invoice or billing department with the information necessary to charge each buyer.

Merchandise Withdrawals and Cash Collections

Upon receipt of the merchandise at the location at which it is to be warehoused and routine check of quantities, etc., the field warehousing company forwards a uniform warehouse receipt to the credit department of the seller. As withdrawals are made, the field warehousing company determines the value by referring to current price list and the quantity withdrawn and makes collection from the buyer by certified check or cashier's check. Upon receipt of either type of check the field warehousing company delivers the merchandise to the buyer. The check, together with all information covering the withdrawals, is forwarded to the credit department of the seller.

APPLICATION OF STANDARD COSTS TO TEXTILE FINISHING OPERATIONS

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Directed to the establishment of standard costs by styles for that portion of textile processing operations included in the category of finishing, the present article sets forth the difficulties offered by the variety of finishing treatments and treatment sequences called for by different styles. A procedure to overcome these obstacles is described involving code identification of the various styles to relate them individually to the aggregate of cost standards by the operations applicable to each.

A COMMON source of difficulty and confusion in the installation of standard costs in textile manufacturing plants is found in one of the most important of the processes, that of finishing the grey goods. For the benefit of those not familiar with textiles, finishing includes a number of various processes, all designed to condition the rough woven cloth for sale. These processes include some very simple operations, such as "crabbing" which is a plain water treatment to set the weave and to prepare the cloth for further finishing, steaming, singeing, pressing, drying, shrinking, and several other similar operations. There are also more complicated operations required on certain types of woolens and worsted, such as scouring, fulling, napping, shearing, felting, decating, and special finishing pressing.

In a mill producing one or more very similar types of fabric, with very little variety of special finishes required, the series of finishing operations is often standardized and exactly the same for all styles finished. The costing technique here is relatively simple and involves merely an accumulation of total costs for labor, burden, and indirect materials, and a determination of normal or standard capacity. The costing rate derived is then applied to all cloth finished and variances from standard can be very easily measured and explained.

The Problem: Finishing Costs for Individual Styles

However, it is seldom that such simplification is practical. A mill may produce a number of different styles of grey goods requiring different finishing processes or the same style of grey goods finished in several different methods to produce varying finished effects. There may be a variety of the materials used in the cloth, itself, either wholly or in certain combinations. Cotton warps and woolen filling yarns are an example. Rayon and cotton warps with various filling yarns are also used. Generally speaking, cottons and rayons require less complicated finishing operations than worsted and woolens, and woolen goods require the most complicated and difficult finishing operations, which are extremely important to the final "handle," appearance, and sales value of the cloth.

A most difficult and complicated finishing will require from ten to thirty individual treatments, each in a certain sequence and each contributing specifically to the final weight, length, feel or "handle," appearance, and durability of the cloth. To devise a cost system adequate to such a finishing operation requires a very careful and detailed study of the operation as a whole and of each individual process involved. The requirements of the cost system are a measurement of the relative cost of each operation on each of several styles in order that total finishing costs may be properly distributed to each style and that no style will carry more than the proper proportion of the process cost. At the same time, it is important that the total cost of the whole department or cost center be absorbed by the production passing through the department, regardless of the distribution of styles or the activity of individual operations.

Components of Finishing Costs

The elements of cost in the finishing cost center are: (1) direct labor, (2) indirect materials (may be included in burden), and (3) burden. Direct labor includes all machine operators or attendants and should also include labor engaged in handling cloth between processes, as will develop later. Indirect materials include materials used in finishing, such as starch (for size compounds), soap, solvents (for scouring), fulling compounds; stabilizing chemicals such as resins, dyestuffs, bleaching compounds; and many other chemical agents used for special purposes.

		COST CENTER .50
BUDGET FOR DIRECT LABOR		WET FINISH
PERIOD: 40 HOURS (1 SHIFT)	UNIT: DIRECT LABOR MAN HOURS	UNITS BUDGETED: 1760
BASIS: FULL OPERATION, ALL PROCESSES, DIRECT LABOR, MACHINE ATTENDANCE AND HANDLING.		

ACCOUNT NUMBER	ACCOUNT - NAME	PAYROLL	BUDGETED UNITS	BUDGETED AMOUNT	COSTING RATE
901.50	DIRECT LABOR - HOURLY RATED	44	1760	$ 2112.	1.20
PROCESS CODE	MACHINE OR PROCESS				
A	SINGE	2	80	96.	
B	CRAB	4	160	192.	
C	STEAM	3	120	144.	
D	SCOUR	3	120	144.	
E	CAN DRY	1	40	48.	
F	PIN DRY (SIZE ON PADDER)	1	40	48.	
X	LOO P DRY	2	80	96.	
PP	PADDER	1	40	48.	
R	CLAMP DRY (SIZE)	2	80	96.	
G G/2	SKUTCH / EXTRACT	1	40	48.	
H	FULL	3	120	144.	
I	STRIP (SEE BLEACHING)				
J	DYEING (SEE COST CENTER .51)				
K	BLEACH	1	40	48.	
L	NAP	5	200	240.	
M	FELT (SAME AS NAP)				
N	SANFORIZE	2	80	96.	
O	SHEAR / BRUSH	10	400	480.	
P	DECATE	1	40	48.	
P½	SEMI DECATE	1	40	48.	
Q	PRESS (ALL)	1	40	48.	
TOTAL:	ALL PROCESSES	44	1760	$ 2112.	

EXHIBIT 1

BUDGET FOR INDIRECT LABOR AND EXPENSE					COST CENTER .50 WET FINISH	
PERIOD: 40 HOURS (1 SHIFT)	UNIT: DIRECT LABOR MAN HOURS			UNITS BUDGETED: 1760		
ACCOUNT NUMBER	ACCOUNT NAME	PAYROLL	BUDGETED AMOUNT			COSTING RATES
			FIXED	VARIABLE	TOTAL	
912. 50	SUPERVISORY SALARIES AND WAGES	3	$ 275.		275.	
913. 50	CLERICAL SALARIES AND WAGES	0				
914. 50	INDIRECT LABOR	0				
	TOTAL	3	275.		275.	.1563
915. 50	MAINTENANCE LABOR		90.	429.	519.	
931. 50	FACTORY SUPPLIES			62.	62	
932. 50	MAINTENANCE AND REPAIR			153.	153.	
	TOTAL DIRECT EXPENSE		90.	644.	734.	.4170
	ALLOCATIONS FROM SERVICE CENTERS					
.63	EMPLOYMENT AND CLINIC		12.	5.	17.	
.64	BOILER ROOM		235.	1907.	2142.	
.70	GENERAL FACTORY		158.	863.	1021.	
	TOTAL ALLOCATIONS		405.	2775.	3180.	1.8068
	TOTAL BURDEN		$770.	3419.	4189.	2.3801
	COSTING RATES		.4375	1.9426	2.3801	
	DIRECT BURDEN			2451.	2451	1.3926
	INDIRECT BURDEN		770.	968.	1738	.9875

(SEE DISTRIBUTION OF DIRECT BURDEN BY PROCESS)

(APPLY SPECIFIC COSTING RATES TO PROCESS BURDEN)

EXHIBIT 2

For inventory and cost purposes, it is advisable to include indirect materials in direct burden to distinguish them from the raw or direct materials. Burden includes direct expense items directly allocated to specific processes, as well as general factory burden allocated to the cost center as a whole.

Budget Figures for Forty Hours' Operation

The first step in the installation of a standard cost system in the finishing cost center is the establishment of operating budgets. The expense budgets should be set up based on a specific period which should be regarded as normal or standard. The determination of a normal operating rate for the finishing department would usually be governed by the weaving capacity at normal operation. For example, if the weaving normal were set at 2-shift 80-hour operation and the finishing department could handle the production of the weaving department at normal in the same period, the normal operating rate for the finishing department would be the same, 80 hours per week.

Often it is not practical to obtain such an exact balance between the two producing departments and, in cases where a great variety of cloth is being woven and where numerous finishing processes are involved, some parts of the finishing department would be operating at full capacity while other parts would be operating at only a fraction of the normal. In such cases, it will be found that all expense items may be budgeted for a fixed period, say, 40 hours per week. By adjusting all expense to the period selected, the costing rates will be relative, regardless of the actual operating rate. Premium payments for overtime or shift premiums can be separated from the standard allowances and treated as variances.

Direct Labor Budget Basis of Man Hour Costing Rates

The basis for determination of costing rates selected in the company which serves as the background for this paper was the direct labor man hour. Because of the complications and variety of the individual finishing operations, the usual machine hour unit does not appear adequate to our purpose. After considerable investigation it was decided that the direct labor man hour was most easily controlled through payroll analysis and more convenient. The budget for direct labor, as shown in Exhibit 1, provides for machine attendance for each process, including those processes

							COST CENTER .50	
DISTRIBUTION OF DIRECT BURDEN BY PROCESS							WET FINISH	
CODE	PROCESS	STEAM CONSUMED	ELECTRIC POWER	ELECTRIC HEAT	GAS HEAT	WATER	DEPRE-CIATION	TOTAL
A	SINGE	$	$ 11.00	$	$ 112.00	$	$ 2.00	$ 125.00
B	CRAB	120.00	13.00			42.00	4.00	179.00
C	STEAM	60.00	8.00				3.00	71.00
D	SCOUR		4.00			52.00	1.00	57.00
E	CAN-DRY	440.00	14.00		26.00		6.00	486.00
F	PIN-DRY	180.00	9.00	12.00			5.00	206.00
X	LOOP-DRY	380.00	4.00				3.00	387.00
PP	PAD		3.00				1.00	4.00
R	CLAMP-DRY	240.00	19.00				4.00	263.00
G	SKUTCH		4.00				1.00	5.00
G2	EXTRACT		5.00				1.00	6.00
H	FULL		24.00			22.00	1.00	47.00
I	STRIP (SEE BLEACH)							
J	DYEING (SEE COST CENTER .51)							
K	BLEACH		5.00			42.00	1.00	48.00
L	NAP		13.00				4.00	17.00
M	FELT (SAME AS NAP)							
N	SANFORIZE	320.00	12.00				16.00	348.00
O	SHEAR		5.00				3.00	8.00
O2	BRUSH (SAME AS SHEAR)							
P	DECATE	50.00	5.00				1.00	56.00
P½	SEMI DECATE	57.00	3.00				2.00	62.00
Q	PRESS	60.00	13.00				3.00	76.00
TOTALS		1907.00	174.00	12.00	138.00	158.00	62.00	2451.00
DISTRIBUTION BASIS		POUNDS USED	CONNECTED HORSEPOWER	CONNECTED WATTAGE	METERED	METERED	PLANT LEDGER	
PERIOD: 40 HOURS (1 SHIFT)								
GCL								

EXHIBIT 3

that are intermittent or irregular and those that involve merely observation. In this particular case the classification of indirect labor, as such, was eliminated entirely from the budget, because the methods and assignments found most efficient provide for all labor in the department to be interchangeable and to handle material between processes and to include delivery to the next process. This phase will be further explained in connection with discussion of the time allowances.

Direct and Indirect Expense Budgets

The budget for expense includes provision for supervisory salaries and wages and for fixed expense, as well as maintenance labor and supplies and general factory supplies. Allocations from service centers are also shown on Exhibit 2. The costing rates used are derived from the budgeted direct labor man hours as shown on Exhibit 1. The total burden budgeted is broken down into two sections, direct and indirect burden, with over-all costing rates shown. The indirect burden includes all items of expense which are spread over the cost center as a whole. The indirect burden rate is therefore applicable to all costing for this center. The direct burden consists of those items of expense which should not and do not fall equally on all processes or, as they may be called, subcenters. These items of expense, with their distribution to individual processes or operations, are shown on Exhibit 3, Distribution of Direct Burden by Process.

Although this may be clear as stated, the instance of the use of steam, which may be required in large quantities on certain machines, in smaller quantities on other machines, and not required at all on some processes may be given as an illustration point. The same general explanation applies to the other items of expense similarly distributed. It should also be commented that the total variable charge for steam, originating with the service center 64, Boiler Room, is for process steam, while the fixed charge from the same center for heating purposes and general service to the whole center is included in the indirect burden charge, which shows on Exhibit 2.

Indirect Materials

Indirect materials are not budgeted but are handled as variable expense with standard cost and usage rates, exactly the same as prime raw material. The reason for this distinction should be

obvious, as consumption of such materials is generally controlled by production requirements and by specifications. However, indirect material costs may be included in total burden by the application of either standard costing rates or by adding standard costs per unit to the costs derived directly from the budgets.

Setting Time Allowances for Finishing Processes

It would be unnecessary to attempt to describe in detail the methods used to determine standard time allowances for each operation. It will perhaps suffice to point out that certain fundamentals must be observed. For example, a study of a given operation would include determination of the point at which the operator or attendant receives the goods to be processed, with the time allowance set to include transfer of the goods to the feeding point, the speed and capacity of the machine, the operating efficiency measured, and an allowance for removing the goods from the machine and delivery to a specified point for the next operation. Allowances must be made for normal stoppages, and also for fatigue or personal time if thought advisable. No allowance should be made for other than normal or anticipated maintenance, cleaning, etc., or for idle machine time due to faulty scheduling or the familiar "no work ready." In general, the allowance regarded as standard should be sufficient to reflect normal expected efficiency under ordinary (not ideal) production routines.

Time allowances in finishing, as previously indicated, are expressed in man hours and the unit of production can be one or one hundred yards or any convenient unit. In processes for which there is a time factor for the completion of the process—such as scouring—the full allowance should be made for attendance at the machine or group of machines. Usually machines of this type are so arranged that the actual attendance and operation is in cycles, i.e., the operators are usually occupied with loading one machine while the other is running or some such form of continuous operation, but care should be taken that adequate allowances be made for the type of operation to avoid variances due to intermittent operation. Time allowances for this type of operation are expressed as follows: man hours per hour scoured or some such designation and the required time is determined by the finishing specifications used to develop the special allowance for each style, as will be seen later.

COST CENTER .50

STANDARD PRODUCTION TIME ALLOWANCES

WET FINISH

PROCESS DESCRIPTION: (SEE SECTION 1 FOR GENERAL DESCRIPTION)

NOTE 1: OPERATORS ALTERNATE ON SOME PROCESSES. SCHEDULE BELOW PROVIDES FOR MAXIMUM CAPACITY OPERATION

NOTE 2: FULLING ALLOWANCE FOR 1 HOUR. APPLY FULLING TIME SPECIFIED FOR EACH STYLE

NOTE 3: DOES NOT INCLUDE ROYALTIES (BURDEN).

PRODUCTION UNITS: DIRECT LABOR MAN HOURS BUDGETED: 1760

STANDARD OPERATION: 40 HOURS, ONE SHIFT PER WEEK,

OPERATION CODE	OPERATION NAME	MACHINES	MACHINE HOURS	PRODUCTION SHIFT	PRODUCTION MCH. HR.	OPERATORS SHIFT	OPERATORS HOURS	PRODUCTION PER MAN HR.	MAN HOURS PER 100 LBS
A	SINGE	1	8	45360	5670	2	16	2835	.0353
B	CRAB	4	32	25504	797	4	32	797	.1255
B2	DOUBLE CRAB			17002	531			531	.1883
C	STEAM	3	24	19128	797	3	24	598	.1672
C2	DOUBLE STEAM			12758	531			399	.2506
CO	SCOUR (FOR DYEING)	3	24	6800	283	3	24	283	.3534
CN	SCOUR NATURAL			9800	408			408	.2450
E	DRY- SIZE- CANS	1	8	15938	1992	1	8	1992	.0502
F	PIN DRY (WOOLENS)	1	8	8606	1076	1	8	1076	.0929
X	LOOP DRY	1	8	6750	844	2	16	422	.2370
PP	SIZE ON PADDER	1	8	14848	1856	1	8	1856	.0539
R	CLAMP DRY- SIZE	1	8	7108	888	2	16	444	.2252
G	SKUTCH ONLY	1	8	13600	1700	1	8	1700	.0588
G2	EXTRACT- SKUTCH	2	16	10200	1275		8	638	.1567
H	FULLING WOOLENS ONLY NOTE2	5	40	10400	260	3	24	433.3	PER HOUR FULLED .2308
I	STRIP (SEE BLEACH)								
J	DYEING (SEE SPECIAL ALLOWANCES FOR DYEING, COST CENTER .51)								
K	BLEACH	1	16	1632	102	1	8	204	.4902
L	NAP EACH RUN	5	40	12800	320	5	40	320	.3125
M	FELT (SAME ALLOWANCES AS NAP)								
N	SANFORIZE(NOTE 3)	1	8	14450	1806	2	16	902	.1109
O	SHEAR OR BRUSH	5	40	21600	540	10	80	270	.3704
P	DECATE	1	8	2560	320	1	8	320	.3125
P1	SEMI DECATE	1	8	5120	640	1	8	640	.1563
Q	PRESS (ALL)	1	8	2160	270	1	8	270	.3704

DATE	WRITTEN BY	APPROVED BY	REVISIONS
8/1/48	G.C.L.	G.C.L.	

EXHIBIT 4

	COST CENTER .39
STANDARD FINISHING SEQUENCE CODES	WET FINISH

Code	Operations	Man Hours per 100 Yds.
8.01	SINGE, CRAB, STEAM, SIZE, LOOP-DRY, SEMI-DECATE	.7732
8.02	SINGE, CRAB, STEAM, SIZE/ CAN-DRY, SANFORIZE	.4891
8.03	SINGE, CRAB, STEAM, CAN-DRY, SANFORIZE	.4891
8.04	SINGE, CRAB, STEAM, SIZE/ CAN-DRY	.3782
8.05	SINGE, CRAB, STEAM, SCOUR, EXTRACT, BLEACH, CLAMP-DRY, SANFORIZE	1.5560
8.06	SINGE, CRAB, STEAM, SIZE/ LOOP-DRY, DECATE	.9314
8.07	SINGE, CRAB, SCOUR, EXTRACT, CLAMP-DRY, SHEAR, PRESS	1.5385
8.08	CRAB, SCOUR, EXTRACT, CLAMP-DRY, PRESS	1.1228
8.09	DOUBLE-CRAB, DOUBLE-STEAM, SCOUR, EXTRACT, CLAMP-DRY, SHEAR, PRESS	1.9159
8.10	DOUBLE-CRAB, DOUBLE-STEAM, SCOUR, EXTRACT, CLAMP-DRY, BLEACH, SHEAR, PRESS	2.2968
8.12	SCOUR, EXTRACT, PIN-DRY, FULL, MAP, FELT, SHEAR	1.6892
8.13	SCOUR, EXTRACT, PIN-DRY, FULL, BLEACH, MAP, FELT, SHEAR	2.211
8.16	SCOUR, EXTRACT, PIN-DRY, FULL, SHEAR, SEMI-DECATE, PRESS	2.4775
8.18	SCOUR, EXTRACT, PIN-DRY, FULL, STRIP, SHEAR, SEMI-DECATE, PRESS	3.0764
8.19	SCOUR, EXTRACT, PIN-DRY, FULL, SHEAR, SEMI-DECATE, PRESS	2.5859
8.20	CRAB, SCOUR, CLAMP-DRY, PRESS	.9661
8.24	CRAB, SCOUR, EXTRACT, CLAMP-DRY, MAP, PRESS	1.4353
8.25	CRAB, STEAM, SCOUR, EXTRACT, CLAMP-DRY, PRESS	1.3884
8.26	SCOUR, EXTRACT, PIN-DRY, FULL, BLEACH, SHEAR, SEMI-DECATE, PRESS	2.9977
8.28	SINGE, CRAB, STEAM, CAN-DRY	.3782
8.30	SINGE, CRAB, SCOUR, EXTRACT, CLAMP-DRY, BLEACH, SHEAR, PRESS	2.0187
8.31	CRAB, SCOUR, EXTRACT, CLAMP- RY, BLEACH, PRESS	1.6130
8. 32	CRAB, STEAM, SCOUR, EXTRACT, CLAMP-DRY, DECATE	1.2321

"EXTRACT-" MAY BE EITHER EXTRACT OR SKUTCH
"SHEAR-" MAY BE EITHER SHEAR OR BRUSH
FINISHING SEQUENCES SUBJECT TO SPECIFICATIONS FOR INDIVIDUAL STYLES.

DATE	WRITTEN BY	APPROVED BY	REVISIONS
12/23/48	G.R.B.	G.C.L.	

EXHIBIT 5

In making studies, the usual time study techniques may be used, with stop watch timing of repeated motions and handling movements, supplemented by general observation and consideration for handling habits and methods. It might be noted here that most finishing operations at first appear highly susceptible to improvement and the application of scientific methods for cost reduction and increased efficiency, but it will be found with long experience that certain finishing operations are more of an art than a science, and tradition and experience will sometimes resist modern methods. In extremely modern installations, continuous process and automatic handling equipment has reduced costs and increased efficiency, but there are many cases where such methods do not seem adaptable.

The importance of carefully developed time standards is obvious since all expense distribution is based on the rates derived from the man hours allowed. Exhibit 4 is a summarized schedule of time allowances for individual finishing processes.

Establishing "Code" Standards

If we may now assume that we have developed adequate direct labor and expense budgets and, from them, costing rates which are then applied to the time standards which we have established, our next step is to determine total standard costs for each specific sequence that various styles must pass through before being finished in the manner specified. Exhibit 5 is a description of certain finishing codes which are specified for different styles and the total man hours allowed for the complete sequence which, as previously explained, provides for all handling through the various processes and to the finished state. By referring to Exhibit 4 it will be seen that Code 8.01, which includes singeing, crabbing, steaming, sizing (on padder), loop drying, and semi-decating will total .7752 man hours per 100 yards and this figure is entered on Exhibit 5. By the application of the costing rates to this code standard, the standard cost may be determined in total, or broken down by direct labor, direct and indirect burden, fixed or variable costs, or in several other classifications if required.

To this total cost must be added the cost for indirect materials which, as previously stated, can be derived from a costing rate or as a direct cost. We prefer to derive this directly for control purposes and for that reason we have not previously discussed setting standards for indirect materials.

					COST CENTER .50		
STANDARD FINISHING FORMULAS (FOR COSTING INDIRECT MATERIALS)					WET FINISH		
CODE	PROCESS MATERIALS USED	QUANTITY LBS.	PRICE	COST	PIECES	STANDARD YARDS	COST PER 100 YDS.
H	FULLING (WOOLENS)						
	FULLING SOAP	400	.18	72.00			
	ALKALI	150	.0013	1.95			
	DETERGINE	100	.20	20.00			
	EXOL NO.9	183	.20	36.60			
	200 GALLON SOLUTION			130.55	90	6300	$ 2.07
D	SCOUR: (WOOLENS)						
	PERSOL	20	.15	3.00	.8	560	.536
D	SCOUR: (WORSTEDS)						
	EXOL NO.9	160	.20	32.00			
	AMMONIA	10	.032				
	32 GALLON SOLUTION			32.32	12	1080	2.99
K	BLEACHING:						
	BECCO OR ELINE	60	.205	12.30			
	SILICATE	6	.0235	.14			
	SOLVATEX	2½	.17	.43			
	ACETIC ACID	2½	.089	.20			
	BLUE	FR.	.445	.03			
	300 GALLON SOLUTION			13.10	9	810	1.62
RF	WOOL FINISH NO.1						
	WOOL FINISH-CLAMP DRY	450	.0925	41.63			
	100 GALLON SOLUTION			41.63	80	7200	.58
EXC	WOOL FINISH NO. 2						
	WOOL FINISH- CAN DRY	300	.0925	27.75			
	200 GALLON SOLUTION			27.75	50	4500	.617
S	SIZE FORMULAS						
	LINE 12 HEAVY			27.06	50	4500	.60
	LINE 15 MEDIUM			23.02	50	4500	.51
	LINE 16 MEDIUM			21.93	50	4500	.49
	LINE 18 LIGHT			19.50	50	4500	.43
	LINE FINISH		PRICE	12	15	16	18
	STARCH 110- 80- 77- 60- LBS.		.0775	8.53	6.20	5.97	4.68
	RHONITE 10-9.2- 8.8- 8- LBS.		.138	1.38	1.27	1.21	1.10
	PENETRANT 50- 42- 38- 33-LBS.		.20	10.00	8.40	7.60	6.60
	CARBOLOSE 30		.145	4.35	4.35	4.35	4.35
	CASTOR OIL 10		.28	2.80	2.80	2.80	2.80
	200 GALLON SOLUTIONS			27.06	23.02	21.93	19.50

EXHIBIT 6

Setting standards for indirect materials is relatively simple, providing the basic information is reasonably correct and adequate allowances are made for waste and shrinkage. The finishing chemist should be consulted. It will generally be found that a very accurate set of formulae is kept for finishing processes, as such formulae are more important for control of the quality and character of the finished cloth than they are for cost purposes. It will also be found that minor variations in the usage or waste factors do not materially affect the total cost per unit. Exhibit 6 is an example of the derivation of standards for indirect materials.

Using Code 8.01 again as an example, it will be noted that on Exhibit 5, this style includes sizing. Specifications not shown on these exhibits would determine the "line" finish which we will say is "line 12," "heavy," with the indicated cost per 100 yards as 60 cents as on Exhibit 6. This cost can be shown separately on the cost sheet, or added to the burden cost as shown on Exhibit 7, which is a summarized cost table for the same group of finishing codes as is shown on other exhibits.

It will be further seen from Exhibit 7 that in this one set of code standards the finishing costs range from $1.72 per 100 yards to $13.54 per 100 yards. The difference in cost is, of course, due to several factors but the indication is that if certain expenses were applied over all styles, this differential would not be provided for and that only by the careful analysis and distribution of certain elements of cost to the proper processes, do the various styles finished bear their proper proportion of the total cost.

All of the standards discussed are for the standard unit of 100 yards. Shrinkage in finishing operations or stretching, as sometimes is the case, is provided for by costing the unfinished cloth in raw material, direct labor, and burden at the number of yards required to finish at 100 yards. In some cases, certain cloths will finish at 100 yards from a lesser yardage in grey cloth, whereas others will require much greater lengths of grey cloth to finish out at 100 yards.

Seconds, rejects, and cutouts for defects are also provided for in the same manner. Percentage figures, based on accumulated experience from accurately compiled records, are used to determine the normal amount of seconds, etc., produced per 100 yards and are allowed for in the style costs. Refinishing operations are not provided for in the standards, but are treated as variances.

COST CENTER 20

CODE COST STANDARDS

UNIT: 100 YARDS FINISHED.

WET FINISH

CODE	MAN HOURS PER 100Y	DIRECT LABOR	PROCESS MATERIALS	BURDEN DIRECT	BURDEN INDIRECT	BURDEN MATERIAL	TOTAL BURDEN	TOTAL COST PER 100 Y
8.01	.7752	$ .93	SIZE	$ 1.69	$ .77	$ .60	$ 3.06	$ 3.99
8.02	.4891	.59	SIZE	1.39	.48	.60	2.47	3.06
8.03	.4891	.59		1.39	.48		1.87	2.46
8.04	.3782	.45	SIZE	.90	.37	.60	1.87	2.32
8.05	1.5560	1.87	SCOUR, BLEACH	2.26	1.54	4.61	8.41	10.28
8.06	.9314	1.04	SIZE	1.88	.92	.60	3.40	4.44
8.07	1.5285	1.83	SIZE, SCOUR	1.81	1.51	3.59	6.91	8.74
8.08	1.1228	1.35	SIZE, SCOUR	1.74	1.11	3.59	6.44	7.79
8.09	1.9150	2.30	SCOUR (DYED STYLES)	2.02	1.89	2.99	6.90	9.20
8.10	2.2968	2.76	SCOUR, BLEACH (NATURAL)	2.56	2.27	4.61	9.44	12.20
8.11								
8.12	1.8292	2.20	SCOUR, FULL, (DYED STYLES)	.91	1.81	2.61	5.33	7.53
8.13	2.2110	2.65	SCOUR, BLEACH, FULL	1.44	2.18	4.23	7.85	10.50
8.14								
8.15								
8.16	2.4775	2.97	SCOUR, FULL (NATURAL)	1.94	2.45	2.16	6.55	9.52
8.17								
8.18	3.0761	3.69	SCOUR, FULL, STRIP (DYED)	2.58	3.04	4.23	9.85	13.54
8.19	2.5859	3.10	SCOUR, FULL (DYED)	1.99	2.55	2.61	7.15	10.25
8.20	.9661	1.16	SCOUR, (NATURAL)	1.70	.95		2.65	3.81
8.21								
8.22								
8.23								
8.24	1.4353	1.72	SCOUR (NATURAL)	1.77	1.42	2.99	6.18	7.90
8.25	1.3984	1.68	SCOUR (DYED)	1.89	1.28	2.99	6.26	7.94
8.26	2.9677	3.56	SCOUR, FULL, BLEACH	2.47	2.93	4.23	9.63	13.19
8.27								
8.28	.3782	.45		.90	.37		1.27	1.72
8.29								
8.30	2.0190	2.42	SCOUR, BLEACH	2.46	1.99	4.61	9.06	11.48
8.31	1.6130	1.93	SCOUR, BLEACH	2.33	1.59	4.69	8.53	10.46
8.32	1.2321	1.48	SCOUR	1.58	1.22	2.99	5.79	7.27

ADD FOR WOOL FINISH NO.1 .58 PER 100 YDS. WOOL FINISH NO.2, .62 PER 100 YDS.

EXHIBIT 7

Determination of Variances

Variances are determined by the usual methods, but a short explanation of the application of this particular system to variance determination might be of interest. Daily reports, accumulated on a weekly basis, dropping and adding a day each time, are made on the number of "code yards" finished. Each style is supposed to pass through the exact series designated as standard so that the total yards finished of a certain style in a certain code are the code yards. By applying the standard total time allowance to the total code yards, the allowances for direct labor, direct and indirect burden, and indirect materials may be derived.

Labor variances are analyzed weekly and reported to production departments. The variance account is shown for the entire cost center but provision is made for analyzing unusual variances for rate or production variances by the cost center as a whole and by individual operations. As all of the labor is variable (with the exception of the supervisory account which is allowed as a fixed charge) the total man hours allowed multiplied by the costing rate will determine the standard allowed payroll which, when applied against the actual payroll, will show the variance.

It has been found that if the time allowances are properly set, the actual production variances are not important and that the most frequent variance is due to so-called idle time which may be caused by faulty scheduling, mechanical breakdown, or a variety of other reasons. It is recommended that provision be made for carefully reporting idle time and the reasons therefor and that the supervisory personnel be trained in the handling of labor to avoid unabsorbed labor variances. In an operation of this type, this may seem difficult, as certain conditions inherent in the method of handling the materials cannot be avoided, but it has been found that when the supervisory personnel is familiar with the method used in determining variances and in the standards set, a highly improved performance may be expected after a relatively short trial.

Variances in indirect materials and in burden are reported on the basis of units produced and value earned on a monthly basis. The rate of operation, determined by the man hours absorbed, is applied to the variable elements and the fixed charges absorbed at 100 per cent. Man hours charged to refinishing operations are reported in code form as variances. The aggregate of this vari-

ance is very small and is absorbed without any special provision in the costs.

On the Road to Control of Finishing Costs

Finishing costs are generally difficult to control, especially by individual styles, where the cost center is equipped and ready to handle many different types of finish and may or may not be called upon to finish all or any of the code sequences. Any significant variance, especially in direct labor, is an indication that the finishing schedule and planning is not being properly handled and that operators are idle or waiting to handle goods that are not ready. From the standpoint of cost control, all of the labor in this department should be as nearly variable as is possible and the production so planned that operators may alternate between various operations and avoid unabsorbed labor charges. This ideal situation is, of course, difficult to obtain but, as previously pointed out, a complete understanding between the cost department and the operating departments regarding the basis and application of the standards may achieve a high decree of cost control.

The importance of the finishing costs in relation to the total cost of the product as well as to the saleability and reputation of the product is so great that we feel justified in recommending the somewhat exhaustive method for cost determination and control presented in this article. Under some methods, total finishing costs are completely and adequately absorbed over all products regardless of relative costs but, in many cases, a more exact and equitable distribution of costs product-wise must be obtained for correct determination of costs and of selling price differentials.

THE COST FORUM

Sampling for Quality Control

Editor, N. A. C. A. Bulletin:

In view of the fact that cost control is one of the most important functions of cost accounting, it would appear that any mechanism or device which would make that control more effective should be deserving of the most serious consideration and active investigation. From my limited observation, statistical quality control falls into this category. Its objectives of greater production, better quality, and lower cost fall right in line with cost control and the setting of sound cost standards. In all of these matters, the cost accountant is vitally concerned.

Statistical quality control is based on the determination of quality by scientifically sampling a small percentage of the units produced as contrasted with 100 per cent inspection. The factors by which product quality is measured, such as size, strength, etc., are reflected separately on control charts by plotting variations from standard shown by items of the sample, in order to quickly determine whether the variations within the samples are due to: (1) chance causes inherent in the process and which cannot be economically removed or (2) assignable causes indicating correctable errors which can be economically removed. Variations due to chance are plus and minus deviations within established limits showing as a band across the chart. These are within tolerance. An operation reflecting such variations is said to be "in control." However, when variations are not due to chance but show on the graph outside the limit of tolerance, an operation is recognized as "out of control," which means that the cause is assignable to some correctable influence such as mistakes by machine operator, inferior raw material, etc. As soon as it is detected that an operation is "out of control," an immediate investigation is made to ascertain the causes in order to eliminate them before they become serious.

To attempt to list and adequately explain all of the direct and indirect benefits obtained through the various applications of the statistical quality control tool would require many pages. Suffice it to say that they range from improving raw materials received to bettering finished products shipped, and from advancing producer-consumer relations to promoting greater understanding between management and employees. However, the factors which impressed me the most at a recent quality control conference and training course during which the principles were demonstrated were: (1) reduction of rejects and scrap and (2) more scientific basis for setting standards. Two companies using statistical quality control have cut rejects in certain departments by 25 to 50 per cent and in one case by more than 80 per cent. These reductions were made possible, first, by ascertaining what caused the rejects—whether it was the operator, the machine, or the material —and second through speed in effecting corrections by placing control charts in view of machine operators.

With respect to provision, through statistical quality control, of a more scientific basis for setting standards, I must admit that this is somewhat my own idea since, so far as I know, proponents of this method of quality control have not been particularly active in making such claims although they have demonstrated its use in establishing sounder product specifications. However, I could come to no other conclusion after having heard of how statistical quality control had increased the productivity of operators and machines, reduced scrap and rework, and prolonged the useful life of tools and dies. While my approach is undoubtedly somewhat in reverse order, I hesitate to think of how bad a set of performance standards might look when compared to improved actual results obtained through the use of a subsequently installed statistical quality control system.

It is not intended to imply in the above comments that the cost accountant should be the dominant force in the installation or operation of a statistical quality control application since such a task seems more logically to fall in the province of the inspection department but, in view of the cost reduction potentials of this control tool, it is questionable if the cost accountant is taking the greatest advantage of his opportunities for service if he does not have some knowledge of how statistical quality control might assist in a more dynamic and effective cost control program.

TROY A. CHAPIN, JR., *Chicago Chapter*

Measuring Prestandard Performance on Unrated Jobs

Editor, N. A. C. A. Bulletin:

Substantial losses due to labor inefficiency often occur on new jobs which are run without rates until time studied standards can be applied. The following procedure has been adopted in our company to make known to management the extent of the losses and to render it possible for the standards department to make their studies at the earliest possible time.

As a regular procedure, the direct labor variance is computed by individual operator or group of operators. Unrated jobs are included by using actual as equal to standard. Direct summarization, which is by shift and department, naturally reflects the variance on rated jobs only. When this is done, all operator's sheets disclosing work performed on unrated jobs are pulled out and rated at the estimated rate on which the respective jobs were sold, thus providing, upon computation and comparison with actual cost, a dollar variance and per cent of variance for management use.

The per cent of work performed on unrated jobs to total labor is also furnished to management and is used to judge the speed and efficiency with which the standards department is able to get rates set on jobs. As soon as the operator's sheets containing unrated work have been processed as above, they are sent to the standards department as the earliest possible notification of the jobs that require attention. The information is received in the standards department on the second day following the performance of the work.

E. A. WOLTMANN, *Detroit Chapter*

The Accountant and the Salesman

Editor, N. A. C. A. Bulletin:

In a nation-wide industrial operation or a local firm, the accountant can act as a harmonizer of operating functions. Whether the project be installation of new production methods, inauguration of an advertising campaign, or proposed methods of marketing, the accountant will necessarily be consulted because the initial consideration is cost. But his opportunity is broader than direct advice.

This paper approaches the relationship between the accountant and one other person, the salesman, and points out how the element of harmony can be supplied by the accountant. Any company is made up of groups of individuals whose loyalty is firm where the entire company is concerned, but who tend to "clan" if it comes to an issue of department against department. Salesmen in business form a group of their own, a spirited group, and being extroverts by nature, they sound off the loudest at any change which affects them. Where the change alters income or methods of reimbursements, it is the accounting department which bears the brunt of the salesman's wrath. Tips on "harmonizing" with salesmen can include the following:

1. *Full explanation of new policies*—Whether the change involves drawing accounts, commissions, or even an extra copy of a form, the salesman expects a full explanation. He feels himself part of perhaps the most important end of the business. A general meeting under the auspices of the management to provide the explanation results in better feelings than a written memorandum.
2. *Quick credit advice on new or reopened accounts*—This is especially helpful in these days of slower remittances and increased insolvencies. It can save salesmen the embarrassment of inability to deliver after taking an order.
3. *Monthly or bimonthly report on sales output*—Where a salesman's production is below quota, such a report can be used to reveal which items he is below par on. Salesmen not being "detail" men, either because of training or lack of time, appreciate figures clearly showing what needs most attention.
4. *Notices to salesmen of customers' supply on hand*—Where merchandise is sold in quantity but delivered piecemeal, either on coupons or from billed stock, a tickler to the salesman gives him an opportunity of selling the account again at the right moment.
5. *Statement of earnings*—Something appreciated by the salesman, if given to him promptly, where an estimate return is to be filed.
6. *Prompt delivery of commission checks*—A day's delay when check is needed causes discontent.
7. *Expense checks*—This check the salesman expects immediately, since he considers it money of his own which he has spent for company benefit.

8. *Care in handling of special accounts*—Where extra invoices or different forms of statements are required, errors not known to the salesman until mentioned by his customer can result in grief.

9. *Explanation of new laws or regulations*—Whether the regulations are State or Federal, a clear knowledge by the salesman of new or proposed enactments enables him to speak intelligently to or even advise customers. These are things of which accountants usually have fuller knowledge and understanding.

10. *Check on unbilled deliveries*—Separate filing of invoices which cover merchandise on loan or billed "invoice to follow." More money is lost from lack of a follow-up system on items sent on approval than is probably realized.

The above are only some of the harmonizing factors between the salesman and the accountant which accomplish good results for each and for the business as a whole. Most important of all is for the salesman to feel that his viewpoint on all these matters is understood and appreciated in the accounting department.

IAN F. STALKER, *Atlanta Chapter*

Loss of Property or Loss of Profits?

Editor, N. A. C. A. Bulletin:

The article entitled "Continuing Expense Estimates and Business Interruption Insurance Coverage" by John L. Flynn in the August 1, 1949, issue of the *Bulletin* is extremely well written and informative on the very important subject of use and occupancy insurance. Mr. Flynn's discussion is quite complete, but there is one point which possibly should be borne in mind.

The way in which use and occupancy insurance is written will affect its taxability for purposes of the Federal income tax. If the taxpayer is insured against the actual loss of profits in the business, the insurance proceeds will be taxable to the same extent that the profits would have been, regardless of the fact that these proceeds may have been in fact used in the restoration of the damage caused by the fire or other casualty insured against. (Miller v. Hocking Glass Co., 80 F 2d 436.)

However, if the contract of insurance does not insure against the loss of net profits but is a contract to pay a flat per diem allowance, such as $250 per day measured from the date of the occurrence of the fire to the time when the property can with ordinary diligence be replaced, then on receipt of the proceeds no gain will be recognized, provided the regulations regarding replacement are complied with. (*Darlington Veneer Co.* Memo B.T.A. P.H. 1942 Memo Decisions paragraph 42124 and *Williams Furniture Corporation* v. *Comm.* (1941) 45 B.T.A. 928.) Attention to this point might well save an owner thousands of dollars.

RALPH R. NEUHOFF, *St. Louis Chapter*

The Production Foreman Has His Say

Editor, N. A. C. A. Bulletin:

Since cost reduction and efficient and harmonious operation are presumably the first interest of all managements, let's give the production foreman an opportunity to defend himself. Let him tell us what we (as management) should be able to dispassionately analyse for ourselves. If he digresses as follows, he may be right in more instances than we care to admit:

1. *Give me cost statements that concern me only*—Do not load my weekly or monthly variance reports with a mass of items over which I have no direct control. I cannot be responsible for those various allocated indirect charges that top management alone authorizes. I want to feel personally liable for the expenditure of every penny included on my report.
2. *Clothe me with authority and back me up*—Let there be no misunderstanding due to fuzzily-worded orders from the front office. When a man is added to our administrative staff, advise all departments at once as to his duties and responsibilities.
3. *Establish clean-cut functional requirements for all departments*—This is the quality that makes for easy cooperation between departments. Let me operate under simple, well-defined instructions so that my men can see for themselves where our department's responsibility begins and ends.
4. *Arrange for my constant and willing support by the methods and engineering departments*—Rest assured that I am intensely interested in any improvement within my department that will permit more efficient production or improve the safety of operation. Discuss with me in advance when there is a new engineering problem arising. My ideas may save considerable time and expense.
5. *Provide me with adequate personnel assistance in job analysis, and selection and training of my men*—If the personnel department works closely with me on job specifications, I can promote and transfer men to the company's best advantage. Also, whenever large expansion (or contraction) of work force is anticipated, I can render valuable aid by way of advance planning. Prior knowledge of contemplated training courses would also permit me to suggest the subjects most needed by my department.
6. *Pay me and my men (according to area standards) for the skill we use and the responsibility assumed*—If we lose good men to our competitors due to our wage scale, we lose much more than the difference in the wage rate. Training time, increased seconds, lowered production, and difficulty of replacement are also factors.

In summary, do you not find that the principles I have emphasized are the ones that you, too, should normally sponsor? Since our needs are parallel, let us recognize this fact in all our relationships.

GEORGE A. RAWCLIFFE, *Fall River Chapter*

Conforming Inventory to Current Requirements

Editor, N. A. C. A. Bulletin:

The accurate determination of the value of a material inventory relative to current requirements is an acute problem in the radio industry particularly, and doubtless in others also. The numerous engineering changes, substitutions for short items, interchangeability of parts, and necessarily fluid production schedules, make mandatory a constant watch for unwarranted inventory accumulation.

To control this in our case, it has proven desirable to know monthly the following primary facts:

1. All components actually required to meet a proposed three-months production schedule.
2. Active items, either on order or on hand in excess of the needs of the period for which the projection is made.
3. Material which has no application in the manufacture of current production models.

Since we maintain inventory control records by the use of electrical punched card equipment, these facts can be determined readily, economically, and accurately for the attention of inventory management as follows:

Fact one—Current requirements are computed, both in values and quantities, by exploding the components of each model in the production schedule through the use of master bill of materials decks. The totals are subtracted from the sum of the on hand and on order position shown by a stock status card.

Fact two—In determining surplus material the results of fact one procedure are made use of. Such surplus is the difference between the stock and requirements, minus the component requirements for production releases not yet scheduled. This, too, is in terms of quantities and value.

Fact three—Obsolete material is represented by all stock items not projected in the above procedures and naturally warrants severe scrutiny.

An obsolete inventory report is prepared each month and forwarded to the development engineering department. There it is carefully scanned for possible incorporation of usable components in models still in production. Recommended disposition of the unusable items is then noted and the report is sent to the inventory committee for evaluation. Here the material is classified into three general categories: (1) hold for possible future use, (2) sell on market at recommended discounts, and (3) scrap outright.

Thus, through this control, executive management has at all times a clear, concise picture of the over-all in-plant inventory as a guide for future production policies and also a warning if inventory should begin to lose balance.

RAE C. NEWELL, *Fort Wayne Chapter*

COMING ARTICLES

In the *N. A. C. A. Bulletin*, November 1949

Corporate Financial Reporting—Selective Study of Annual Statements for 1948
by John B. Inglis

We Are Dragging Our Anchor—The Drift from Historical Cost
by Luis V. Manrara

Coverage and Cost Provisions of the Robinson-Patman Act
by J. Brooks Heckert

Sixteen Years of Multiple Management
by John L. Buckley, Jr.

Securing Maintenance Control Data from the Accounts
by Harlan White

What Records Are Essential for Direction and Control of Sales Effort?
by George M. Batchelder

Organization and Accounting Control of an Employees' Credit Union
by Keith W. Cox and George F. Draper

Internal Cost Reports for Three Levels of Management
by W. E. Guinn

A Streamlined Cost System for Dairy Product Manufacturers
by James H. Gould